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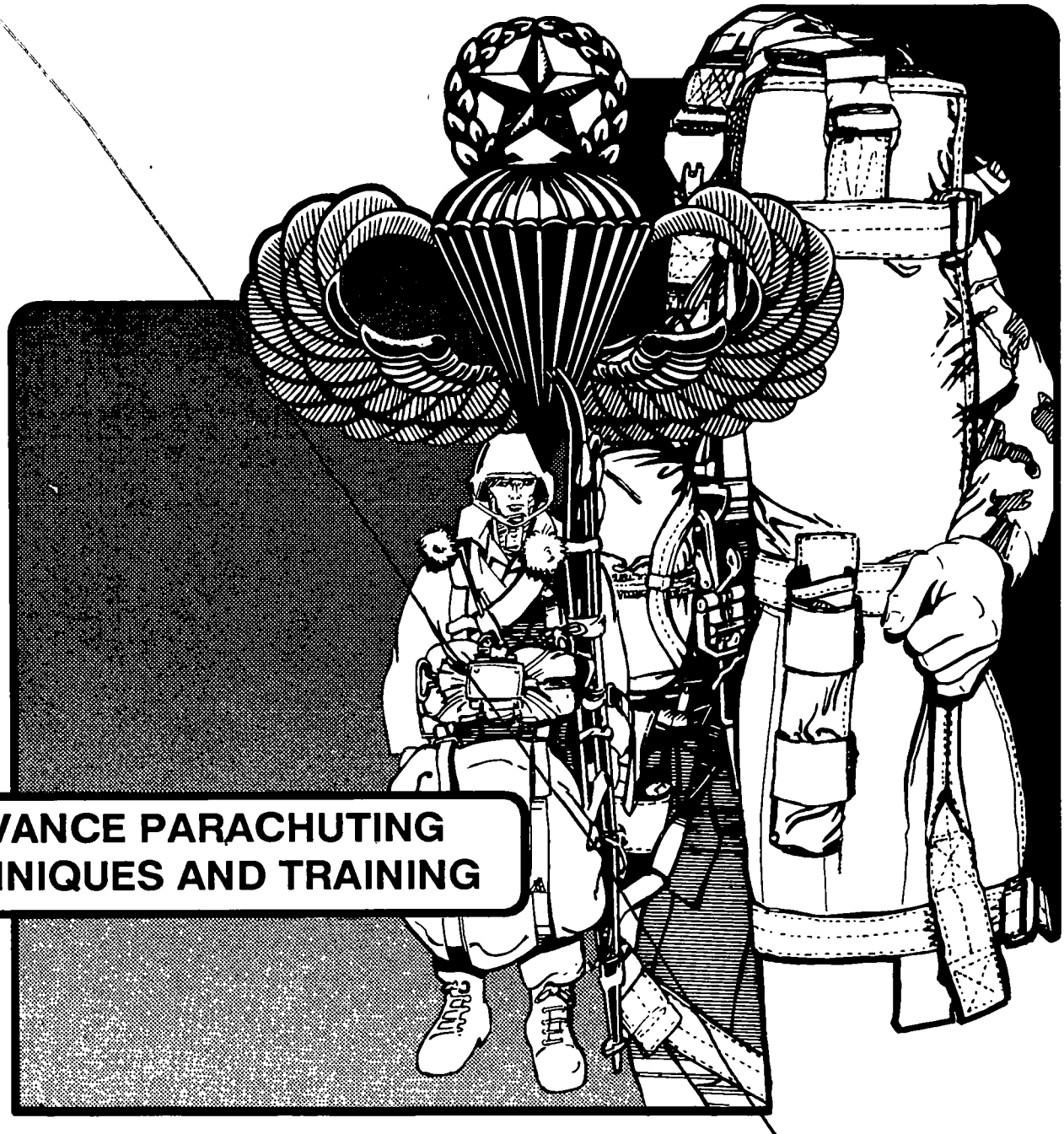

ADVANCE PARACHUTING TECHNIQUES AND TRAINING

SEPTEMBER 1989

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

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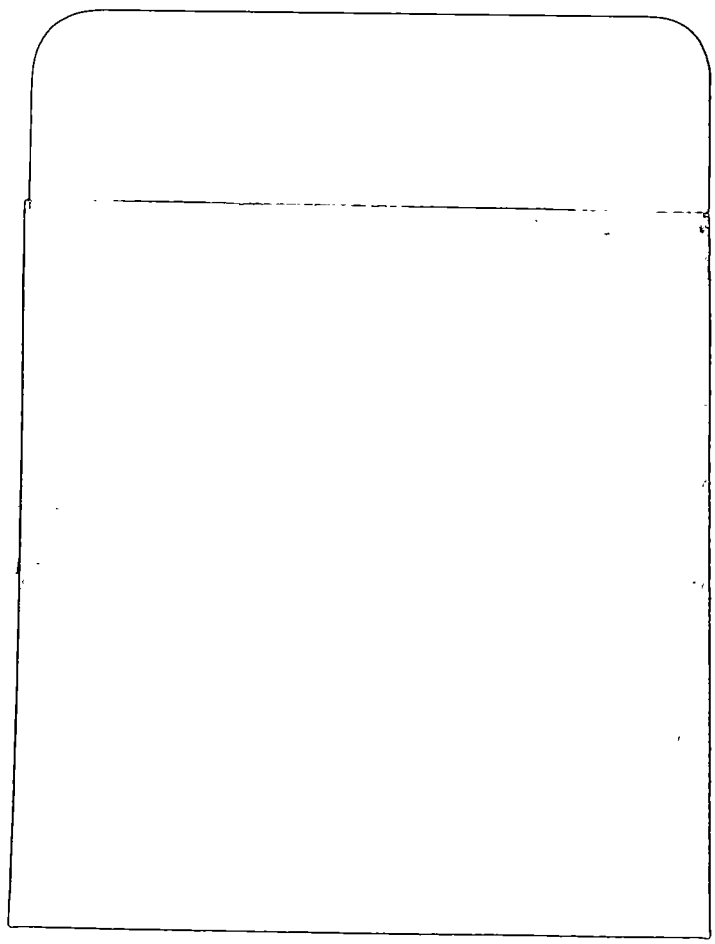

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DEPARTMENTS OF THE ARMY
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COMMANDANT, US MARINE CORPS
Washington, DC, 25 June 1991

ADVANCED PARACHUTING TECHNIQUES AND TRAINING

1. Change FM 57-230/TO 14D1-2-1-121, 13 September 1989, as follows:

Cover. Change cover to include US Marine Corps publication number: "FMFM 7-42."

Page 4-1. Add paragraph 4-1g. "Require 10 minutes for a soldier's eyes to adjust to lower light levels before night operations. Therefore, only red compartment lights are used 10 minutes before drop time. This allows for physical adjustment and minimizes the impairment of a jumper's night vision during the critical first seconds of a night drop. If the white light is substituted for the red light before drop time, the jumper's eyes must readjust by turning on the red compartment lights for 10 minutes."

Page 4-6. Paragraph 4-5e, change note to: "NOTE: Safety personnel check the static line and packtray of the last two jumpers in each stick and give them a sharp tap to indicate that their equipment is correct."

Page 4-8. Figure 4-7, lines 12 and 13, delete "The jumpmaster or assistant jumpmaster" and add "The safety."

Page 4-10. Paragraph 4-7b, line 2, change "6" to "10"; line 4, change "six" to "ten."

Page 4-10. Paragraph 4-8, change to: "4-8. ACTIONS AT THE 10-MINUTE WARNING. The jumpmaster gives the 10-minute warning to the jumpers and then follows the same procedures prescribed for the 20-minute warning."

Page 4-14. Paragraph 4-15a, line 8, after "allowed." add: "Except in the case of an unsafe parachutist, no."

Page 4-15. Paragraph 4-15b(1), lines 1 and 4, change "safety" to "jumpmaster."

Page 4-15. Paragraph 4-15b(2), change to: "(2) After the jump refusal is brought back inside the aircraft, he is guided as far forward in the aircraft as possible, seated, buckled up, unhooked, and directed to not touch his equipment. During training, a refusal will stop the jump for that pass."

Page 6-7. Paragraph 6-9, last line, after "waistband," add "Type II or III nylon cord (gutted) is used to eliminate slack between the V-ring adapter and the parachute harness main lift web. This is done by making one turn through the V-ring loop in the adapter web, and one turn around the main lift web of the parachute harness and the lowering line adapter web. The loose ends must be tied together using a suitable joining knot such as a square knot followed by two overhand knots or a surgeon's knot."

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Page 6-11. Paragraph 6-13, line 8, change to: "left door). During the fourth point of performance, at an altitude of 200 to 100 feet above. . . "

Page 9-4. Paragraph 9-5a(2) change to: "Depending upon the total weight and relative air density, the average rates of descent for the different canopies are: MC1-1B, 18 to 22 feet per second; MC1-1C, 14 to 18 feet per second; and T-10C, 19 to 23 feet per second."

Page 9-4. Paragraph 9-5b, delete "18 feet per second descent rate and an."

Page 9-5. Paragraph 9-5c(1), delete "15 feet per second descent rate and a."

Page 11-2. Figure 11-2, change the outboard seat numbering from 4 through 13 to 24 through 32; and change the inboard seat numbering from 1 through 20 to 4 through 23.

Page 11-2. Paragraph 11-1b, line 7, change to: "Two airdrop certified loadmasters."

Page 11-5. Paragraph 11-3, add the following after the first paragraph: "NOTE: Per message Headquarters, USAF Military Airlift Command (DOXT), 021431ZMay90, over-the-ramp C-130 airdrop is restricted to "combination airdrops, tests requiring over-the-ramp operations to satisfy a specific objective, jumpers required to jump with snow skis, support for special operations forces training, MC-130, pathfinder, and SOLL II operations."

Page 11-5. Figure 11-4, paragraph 3, delete letters "A-1"; change "hit" to "kit."

Page 11-6. Paragraph 11-3d(1), line 1, change "An oral 6-minute. . . " to "A 10-minute. . . "

Page 11-6. Paragraph 11-3d(3), change "(3)" to "(4)." Add a new subparagraph (3), "Jumpers hook up to the appropriate anchor line cable with the open side of the snap hook facing outboard toward the skin of the aircraft."

Page 11-7. Paragraph 11-3d(4) and (5), change subparagraphs "(4)" and "(5)" to "(5)" and "(6)", respectively.

Page 11-12. Paragraph 11-6, line 2, change "157" to "156"; and line 3, change "153" to "152."

Page 11-12. Paragraph 11-6b, line 7, change to: "Two airdrop certified loadmasters."

Page 11-13. Figure 11-9, paragraph 1, change "157" to "156" and "155" to "154."

Page 12-11. Paragraph 12-1b(1), line 1, change to: "Install four snap hooks with safety wires and. . . "

Page 12-17. Paragraph 12-20b, line 7, change "of" to "or."

Page 12-21. Paragraph 12-25g, change to: "g. SOUND OFF FOR EQUIPMENT CHECK. Beginning with jumper No. 28, the jumpers pass the status of their equipment toward the aft end of the aircraft. The No. 1 jumper orally indicates (and with a hand signal) to the jumpmaster the status of his and all other jumper's equipment by stating, "All OK, jumpmaster."

Page 14-2. Paragraph 14-2, line 5, delete asterisks (*) before "1,500 feet" both times; add one asterisk following "USAF AIRCRAFT (TROOP CARRIER)."

Page 14-2. Paragraph 14-3a, line 13, after "deep" add: "within 1,000 meters from the edge of the DZ."

Page 14-3. Paragraph 4-5, change "4-5" to "14-5."

Page 14-3. Paragraph 14-6, add after first paragraph: "NOTE: To convert yards to meters, multiply yards times .91. To convert meters to yards, divide meters by .91."

Page 14-3. Paragraph 14-6b, line 1, after "aircraft" add: "Using a CARP DZ."

Page 14-3. Paragraph 14-6b(2), line 2, change "95" to "90."

Page 14-3. Paragraph 14-6b(3), line 1, change "95" to "90."

Page 14-3. Paragraph 14-6b(4), line 1, change "365" to "370."

Page 14-3. Paragraph 14-6c, line 2, after "aircraft" add: "Using a CARP DZ."

Page 14-3. Paragraph 14-6c, line 3, change "545" to "550"; line 3, change "910" to "915."

Page 14-3. Paragraph 14-6c(1), line 1, change "365" to "370."

Page 14-3. Paragraph 14-6c(2), change "455" to "460."

Page 14-4. Paragraph 14-6c(4), line 2, change "95" to "90."

Page 14-4. Paragraph 14-6c(5), line 2, change "95" to "90."

Page 14-4. Paragraph 14-6c(6), line 1, change "365" to "370."

Page 14-4. Paragraph 14-6d, line 2, after "C-130" add: "using a CARP DZ."

Page 14-4. Paragraph 14-6d, line 4, change "365" to "370."

Page 14-4. Paragraph 14-6d(1), line 2, change "37" to "35."

Page 14-4. Paragraph 14-6d(2), line 2, change "95" to "90."

Page 14-4. Paragraph 14-6d(3), line 2, change "95" to "90."

Page 14-4. Paragraph 14-6e, line 2, after "C-141" add: "Using a CARP DZ."

Page 14-4. Paragraph 14-6e, line 4, change "545" to "540."

Page 14-4. Paragraph 14-6e(2), line 2, change "95" to "90."

Page 14-4. Paragraph 14-6e(3), line 2, change "95" to "90."

Page 14-4. Paragraph 14-6e(4), line 1, change "365" to "370."

Page 14-4. Paragraph 14-6, after last paragraph, change note, line 2, add "formation" before "and type."

Page 14-5. Paragraph 14-7a, line 3, delete "method."

Page 14-5. Paragraph 14-7c, lines 4 and 5, delete "small."

Page 14-5. Paragraph 14-8, line 4, change "remaining" to "parachute."

Page 14-5. Paragraph 14-8a, line 6, change "always" to "usually."

Page 14-5. Paragraph 14-8c, line 2, delete "may be one or more personnel who."

Page 14-5. Paragraph 14-8c, line 3, change "operate" to "operates."

Page 14-6. Paragraph 14-9a(1)(i), change to "Controls all ground and air medical evacuations. Priority for airspace must be given to medical evacuations. This is particularly important when rescue or medical aircraft are involved since they may be delayed if follow-on jumps continue."

Page 14-6. Paragraph 14-9a(1)(j), change "(j)" to "(k)."

Page 14-6. Paragraph 14-9a(1), after (i) add: "(j) Ensures that any water obstacle is covered by a boat detail, which can provide one life jacket for each first-pass jumper. A water obstacle is water more than 4 feet deep that is within 1,000 meters from any edge of the surveyed DZ."

Page 14-7. Paragraph 14-9a(2)(b), NOTE, line 2, change "less" to "more."

Page 14-7. Paragraph 14-9a(2)(b), NOTE, line 3, change "5" to "17."

Page 15-1. Paragraph 15-1, change title to: "DROP ZONE FORMULAS FOR THE GROUND MARKED RELEASE SYSTEM."

Page 15-2. Paragraph 15-1b, EXAMPLE, line 13, delete "free."

Page 15-2. Paragraph 15-2a(1), line 2, change "impact point," to "point of impact (PI)."

Page 15-3. Figure 15-1, change "15-1" to "15-4."

Page 15-3. Paragraph 15-2b, line 7, change "2.5" to "1.5."

Page 15-4. Paragraph 15-2b, line 1, change "4.1" to "3.0."

Page 15-4. Paragraph 15-2b, line 2, add new line 3, "1.5 meters for heavy equipment parachutes"; add new line 4, "2.4 meters for TTB parachutes."

Page 15-4. Paragraph 15-3, line 13, change to: "surface winds for personnel airdrop operations."

Page 15-4. Paragraph 15-3, EXAMPLE, line 4, change STEP 1 to "STEP 1:K = 1.5."

Page 15-4. Paragraph 15-3, EXAMPLE, line 7, change STEP 4 to "STEP 4:1.5 x 5 x 10 = 75.0 or 75 meters of drift."

Page 15-6. Paragraph 15-4b, change chart to:

	C-141	**C-130**
Personnel	250 yards/230 meters	250 yards/230 meters
CDS	750 yards/685 meters	550 yards/500 meters
Heavy Equipment	730 yards/670 meters	500 yards/455 meters
TTB	160 yards/145 meters	160 yards/145 meters

Page 15-7. Paragraph 15-5b, line 2, delete sentence after "woodline." and add "Use a 100-meter buffer zone on one end of the DZ for safety reasons."

Page 15-7. Figure 15-4, change "15-4" to "15-1."

Page 16-1. Paragraph 16-1b, change to: "The primary means of marking the PI during the day should be the raised angle marker (RAM). Colored (VS-17G) panels may be used to supplement the RAM to authenticate or differentiate between DZs within the same area. The panels form a block letter that must be 35 feet by 35 feet, consisting of eight VS-17G panels. The only letters authorized with the RAM are A, C, J, R, and S. However, the letters H and O may be used for circular/random approach DZs. To assist in visual acquisition of the DZ and to indicate the surface wind direction, smoke (other than red) may be displayed adjacent to and downwind of the RAM/letter identifier. For CDS airdrops, smoke should be displayed 200 yards (180 meters) before the PI (six o'clock position)."

Page 16-1. Paragraph 16-1c, line 7, change to: " . . .amber rotating beacon can be placed on the center line and on the trailing edge of the DZ, if previously coordinated."

Page 16-2. Paragraph 16-1e(2), line 2, change to: "the PIs are 500 yards (day) and 550."

Page 16-2. Paragraph 16-1f, line 6, change "350" to "400."

Page 16-2. Paragraph 16-1f, line 7, change to: "yards (400 minimum for C-141) on each."

Page 16-2. Paragraph f, line 12, change to: " . . .panels that are placed side by side to form a 6-foot by 6-foot block. (Location. . . "

Page 16-4. Paragraph 16-2, change first paragraph to: "The GMRS uses markings known as the four-panel inverted L, six-panel T, or seven-panel H. The T or H pattern is recommended for C-141/C-5 airdrops due to the aircraft side angle vision limitations."

Page 16-5. Paragraph 16-2c, line 4, after "aircrew." add: "The markings are placed where obstacles will not mask the pilot's line of sight. As a guide, a mask clearance ratio of 1:15 is used, that is, one unit of vertical clearance for every 15 units of horizontal clearance. (For example, if a DZ marker must be positioned near a terrain mask, such as the edge of a forest, that is on the DZ track and the trees are 10 meters high (33 feet), the markings would require 150 meters (492 feet) of horizontal clearance from the trees. (Figure 16-4.) This applies to static line jumps only. If the GMRS markings fall into the 1:15 mask clearance ratio on a DZ established for static line jumpers, then the markings must be moved forward of the 1:15 mask clearance ratio."

Page 16-5. Paragraph 16-2c, line 8, change "must" to "may."

Page 16-7. Paragraph 16-2c, line 1, change to: "placed on the departure end of the DZ for CDS or bundle drop if coordinated during the DZST/aircrew mission briefing."

Page 16-7. Paragraph 16-3, change title to: "VERBALLY INITIATED RELEASE SYSTEM FOR ARMY ROTARY-WING AIRCRAFT."

Page 16-7. Figure 16-6, change title to: "Code letter night markings."

Page 16-8. Figure 16-7, change title to: "Night markings (VIRS)."

Page 16-9. Paragraph 16-4, line 12, change "C3D356" to "C3D36."

Page 16-9. Paragraph 16-4, line 15, change "a" to "and."

Page 16-9. Figure 16-8, change title to: "Day markings (VIRS)."

Page 17-1. Paragraph 17-1a(1)(c), change to: "Binoculars (daytime) or night vision devices (nighttime)."

Page 20-1. Insert before paragraph 20-1: "NOTE: Only one type of parachute (T-10C or MC1-1B/C) may be used during any one given pass over a DZ. The mixing of parachutes that have different performance characteristics at opening (nonsteerable versus steerable) can cause high-altitude incidents during either ADEPT Option 2 or mass exit operations."

Page 22-2. Paragraph 22-1h, change to: "If the jumpmasters choose to jump in that part of the stick where they can land with their assigned unit, an individual who is a qualified and current jumpmaster must remain near the jump door to control emergencies."

Page 22-2. Paragraph 22-1, delete paragraph (i) and change paragraphs (j) through (r) to (i) through (q) respectively.

Page Reference-2. Line 5, delete "3-3, Combat Control Team Operations and Procedures," and add "55-60, Assault Zone Procedures."

2. Post these changes according to DA Pamphlet 310-13.

3. File this transmittal sheet in front of the publication.

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FIELD MANUAL
No. 57-230
TECHNICAL ORDER
No. 14D1-2-1-121

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
Washington, DC, 13 September 1989

ADVANCED PARACHUTING TECHNIQUES AND TRAINING

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*This publication supersedes TC 57-1, 28 September 1979.

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PREFACE

This manual contains advanced training and techniques for static line parachuting. It is designed to standardize procedures for initial qualification and training of key personnel in their duties and responsibilities in airborne operations. The jumpmaster, assistant jumpmaster, safety personnel DACO, drop zone support team personnel, and drop zone safety officer occupy key positions in airborne operations. The initial training and qualification of these personnel designated to fill those critical positions is contained in this manual.

The planning, preparation, and execution of airborne operations are usually divided into four interrelated phases:

- The marshalling phase (planning and assembly).
- The air movement phase (begins with aircraft take-off and ends with the delivery of units to the drop zone).
- The assault phase (begins with landing on the drop zone and ends with consolidation).
- The subsequent operational phase.

Special operation forces (SOF) unit must meet the requirements contained in this manual as well as provide special training and instruction for nonstandard equipment, aircraft, and personnel procedures. These procedures are documented in FM 31-19, FM 31-34, and FM 31-25.

Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

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PART ONE

DUTIES AND FUNCTIONS OF KEY PERSONNEL

CHAPTER 1

RESPONSIBILITIES AND QUALIFICATIONS

The initial training of these key personnel and follow-on refresher training is a major concern of commanders to ensure standardization and safety prevail in airborne operations.

NOTE: Appendixes A and B are refresher and initial qualification courses for these key personnel.

1-1. COMMANDER'S RESPONSIBILITIES

The airborne commander designates key personnel for each airborne operation. Personnel include jumpmaster, assistant jumpmasters, safety personnel, DZSTL, and DZSO. Each aircraft has a designated jumpmaster. Each DZ has a designated team leader and safety officer. These personnel have command authority over and are responsible for all personnel on board the jump aircraft or on the drop zone. The jumpmaster, team leader, and safety officer can delegate authority to subordinates but cannot delegate responsibility.

1-2. PREREQUISITES

Prerequisites for key personnel are as follows:

a. To be appointed as a jumpmaster, assistant jumpmaster, or safety personnel, individuals must meet the following prerequisites.

(1) Primary jumpmaster.

(a) Be an officer, warrant officer, or NCO (E5 or above).

(b) Graduate of a jumpmaster course.

(c) Performed jumpmaster duties in the past 6 months or

attended a jumpmaster refresher course.

(d) Performed duties twice as the assistant jumpmaster.

(2) *Assistant jumpmaster.*

(a) Officer, warrant officer, or NCO (E5 or above).

(b) Graduate of a jumpmaster course.

(c) Performed duties in the past 6 months or attended a jumpmaster refresher course.

(d) Performed duties once as a safety.

(3) *Safety personnel.*

(a) Officer, warrant officer, or NCO (E5 or above).

(b) Graduate of a jumpmaster course.

(c) Performed safety duties in the past six months or attended a jumpmaster refresher course.

b. To be appointed a drop zone safety officer (DZSO), drop zone support team leader (DZSTL), or malfunction officer, individuals must meet the following prerequisites.

(1) *Drop zone safety officer.*

(a) Officer, warrant officer, or NCO (E5 or above).

(b) Jumpmaster qualified and current.

(c) Performed the duties of assistant DZSO at least once.

(d) Observed the DZSO supporting an airborne operation involving personnel.

(e) For ground marked release system (GMRS) operations, assisted a DZSO during GMRS procedures.

(2) *Drop zone support team leader.*

(a) Officer, warrant officer, or NCO (E5 or above).

(b) Completed initial training and certification in DZST functions.

(c) Observed and assisted a DZSTL during the performance of his duties during an airdrop operation.

(d) Jumpmaster qualified and current jumpmaster to support personnel and heavy equipment airdrops.

(3) *Malfunction officer.*

(a) Qualified parachute rigger from the unit normally providing air items.

(b) For specialized operations using multiple drops where it is not practicable to have a

parachute rigger on each DZ, the DZSO or assistant DZSO may perform these duties, provided he has received special training from a parachute rigger unit on malfunction duties.

(4) *Departure airfield control officer (DACO).*

(a) Officer, warrant officer, or NCO (E5 or above).

(b) Observed or assisted the DACO.

CHAPTER 2

JUMPMASTER DUTIES AT THE UNIT AREA

The success of airborne operations depends mainly on how well the jumpmaster executes his duties. He must receive mission briefings, conduct prejump training, supervise rigging of equipment, and move to the departure airfield all within a rigid time schedule.

Section I. ESSENTIAL INFORMATION

A key factor in the jumpmaster duties is the mission briefing. The H-hour (TOT) is established at this time and the backward planning/training begins.

2-1. DESIGNATION NOTIFICATION

Upon notification that they have been designated as jumpmaster, individuals obtain or are provided the following information:

a. Mission and ground tactical plan.

b. Air movement plan.

c. Names of assistant jumpmaster(s) and safety personnel, and time and place to brief them.

d. Time and place of initial manifest call.

e. Time and place of final manifest call.

f. Time and place to conduct prejump training.

g. Time and place to check and inspect parachutists' uniforms and equipment.

h. Transportation (movement to marshaling area and departure airfield [DA] plan and times).

i. Time and place of parachute issue including types of parachutes.

j. Weather decision time(s).

k. Time and place of troop briefing.

l. Type of aircraft for the operation: special items of equipment being worn by jumpers (DMJP, AT-4, or CWIE) or A-series containers aboard aircraft (door bundles or wedge).

m. Aircraft tail numbers, chalk numbers, and parking spots.

n. Load time.

o. Time and place of aircrew-jumpmaster briefing.

p. Station time.

q. Takeoff time.

r. Air movement plan to include time of flight, formations, route, direction of flight over drop zone, drop altitude, location and design of code letters, racetracks, and emergency call signs/frequencies.

NOTE: If during the Joint Planning and Preparation Phase for airborne operations it is decided that host nation aircraft are to be used without navigational equipment, a detailed pilot, loadmaster, and jumpmaster brief must take place.

s. Landing plan to include drop zones, drop times, delivery sequence, and number/type of loads (PP, HD, CDS, LAPES). Types of drop—CARP or GMRS.

t. Mission and ground tactical plan.

(1) Air item turn-in plan.

(2) Medical support plan.

2-2. ASSISTANT'S BRIEFING

After he receives the initial operation briefing, the jumpmaster returns to the unit and briefs his assistant jumpmaster and safety personnel. The jumpmaster assigns them duties for the remainder of the operation. At this time, the jumpmaster determines who assumes responsibility (of parachutists remaining on board) if he jumps in any position other than that of the last parachutist. Manifest of personnel scheduled to jump is prepared.

a. Upon completion of the briefing, the jumpmaster organizes the chalk (planeload) IAW the cross-loading plan and conducts the initial manifest call. Assistant jumpmaster(s) and safety personnel check the identification card and identification tags of each parachutist.

b. Items for cross-loading include door bundles and large, bulky equipment carried by individual parachutists (container, weapon, individual equipment [CWIE]; Dragon missile jump pack [DMJP]). The jumpmaster determines which chalk and informs parachutists which position and door they will jump.

c. The jumpmaster, aided by his assistant jumpmaster(s) and safety personnel, inspects each parachutist's equipment to ensure proper rigging. Parachutists pack and rig their equipment and containers before airborne operations. (See Chapter 6.)

2-3. JUMPMASTER/SAFETY KIT BAG

The jumpmaster ensures aviator kit bags for use on board the aircraft have been

prepared to contain extra items that may be needed during any phase of the airborne operation. This is referred to as the jumpmaster/safety kit bag and is used by the jumpmaster, assistant jumpmaster, and safety personnel. Items to consider for use on board the aircraft (depending on the type of airborne operation) are:

- Flashlight (night operations).
- Masking tape/cloth.
- Roll of 1/4-inch cotton webbing.
- Safety wires (with lanyards).
- HPT lowering line assemblies.
- H-harnesses with D-ring attached straps.
- Shock pads, neckbands, chin straps, helmet straps, pull-the-dot fasteners with tab, and retention straps.
- Quick-release snaps.
- Retainer bands.
- Trash bags.
- Earplugs and airsickness bags.
- Two extra reserves and extra aviator kit bags (for static lines and deployment—1 bag for each 15 deployment bags).
- A knife should be carried by the jumpmaster, assistant jumpmaster, and safety personnel.

2-4. OPERATION BRIEFING

As soon as practical (after initial manifest call), the jumpmaster briefs personnel on the details of the operation. Following the troop briefing, prejump training is conducted in the unit area or at the departure airfield. It should be scheduled no sooner than 24 hours before takeoff. Items covered include:

- Drop zone.
- Type of aircraft.
- Chalk number(s).
- Type of parachute(s).
- Briefing on serials, container delivery system, heavy drop, and type of aircraft, if a part of a larger airborne operation.
- Weather decision time (for GO, NO-GO decision).
- Type of individual equipment and separate equipment that troops will be jumping (CWIE, DMJP, ALICE packs, M1950 weapons container).
- Time and place of parachute issue.
- Station time.
- Takeoff time.
- Length of flight.
- In-flight emergencies.
- Direction of flight over DZ.
- Drop altitude.
- Predicted winds on the DZ and direction.

- Route checkpoints.
- DZ assembly aids and area.
- Parachute turn-in point(s).
- Time and place of final manifest call.
- Medical support plan.
- Obstacles on or near the DZ.

Section II. PREJUMP TRAINING PERFORMANCE

All personnel require prejump training. The jumpmaster usually does not know the proficiency of all parachutists he is responsible for; therefore, basic airborne jump techniques are rehearsed so each parachutist can demonstrate his ability to perform them.

2-5. MINIMUM TRAINING

Minimum prejump training should include a review of the five points of performance, collisions and entanglements, towed parachutist, malfunctions, activation of the reserve, and emergency landings.

a. Aircraft fuselage mock-ups, if available, should be used to rehearse prejump in-flight action. Mock door training reminds and reinforces parachutists as to what occurs in flight before jumping. The jumpmaster can use the mock door apparatus to show parachutists where their relative positions will be in the aircraft. If in-flight rigging is to be performed, the rigging station locations can be indicated also. The jumpmaster reviews and leads a rehearsal of all actions related to in-flight procedures so the jump mission will be smooth and safe.

b. Each parachutist should be seen by the jumpmaster and should be able to hear him (a bullhorn should be used, if necessary). Performance-oriented training is conducted for emergency landing procedures peculiar to the mission. Assistant jumpmaster and safety personnel must make aggressive and positive on-the-spot corrections. Prejump training must be taught enthusiastically to be interesting.

2-6. FIVE POINTS OF PERFORMANCE

The five points of performance must be adhered to by all parachutists and jumpmasters.

a. **Check body position and count:**

(1) Chin on chest.

(2) Eyes open.

(3) Elbows into sides.

(4) Hand and fingers spread over ends of reserve parachute.

(5) Body bent slightly forward at the waist.

(6) Feet and knees together.

(7) Knees locked.

(8) Count to four by thousands (fixed-wing aircraft).

(9) Count to six by thousands (helicopters).

(10) If parachutist does not feel the opening shock, immediately activate the reserve parachute.

b. **Check canopy and gain canopy control.**

(1) Reach up and grasp toggles (MC1-1B/C); or grasp risers (T-10C). (See Table 2-1.)

(2) Make a 360-degree check of the canopy.

(3) Remove twists, if any; grasp rear risers, thumbs down with knuckles to the rear, and apply outward pressure while bicycling the legs in a direction opposite to the twists.

c. **Keep a sharp lookout during the descent.**

(1) Always look before turning.

(2) Always turn right (when facing each other) to avoid a collision.

(3) The lower parachutist always has the right of way.

(4) Avoid other parachutists all the way to the ground; maintain a 50-foot separation in the air.

(5) Check up, down, and all sides for other parachutists. If clear, release equipment tie-down.

	Individual Actions	Actions Common to Both
T-10C	Slip. Rapid. Gradual. Body turn.	Entanglement and or collisions. Release the CWIE. Release (untie) weapons container.
MC1-1B/C	Turn. Hold. Crabbing. Running.	Lower equipment. Prepare for emergency- type landing in: • Wires. • Trees. • Water.

Table 2-1. Parachutist reactions.

(6) Immediately regain canopy control.

d. **Prepare to land.**

(1) If the air below and around is clear of other parachutists at no higher than 200 feet, lower equipment. Immediately regain canopy control and search for other parachutists.

(2) When 100 feet above the ground level, (demonstrate) slip into the wind or turn and hold into the wind.

(3) Feet and knees together.

(4) Knees slightly bent and unlocked.

(5) Elbows tight into sides.

(6) Head and eyes toward the horizon. Before making contact with the ground, turn the lower portion of the body (below the waist) to a 45-degree angle, exposing the portion of the body that will come in contact with the ground.

e. **Land.**

(1) Make a PLF using the five points of contact.

(2) No stand-up landings.

(3) Remain in a prone position and activate one canopy release using either the hand assist or hand-to-shoulder method.

(4) Recover and turn in equipment.

(a) Remain in prone position; place weapon into operation and remove harness.

(b) Remove air items from D-rings on harness.

(c) Elongate canopy into the wind, remove debris, and figure-eight roll it up.

(d) Insert canopy into aviator's kit bag with bridle loop on top.

(e) Snap kit bag closed; do not zip.

(f) Maintain noise and light discipline. Move rapidly to the nearest turn-in point.

(5) If badly injured, call for a medic.

2-7. FIVE POINTS OF CONTACT

a. Review the following five points of contact:

- Balls of the feet.
- Calves.
- Thighs.
- Buttocks.
- Push-up muscle (right or left side).

b. Perform one satisfactory parachute landing fall in each of the four directions:

- Left side.
- Right side.
- Front.
- Rear.

2-8. MALFUNCTIONS (NO LIFT)

Activate the reserve using the pull-and-drop method.

- Remain in a tight body position.
- Keep feet and knees together.
- Grasp the left carrying handle of the reserve parachute with the left hand.

While descending under the reserve, control the canopy by slipping and assume the landing attitude by reaching up and grasping as many suspension lines as possible with the both hands.

2-9. PARTIAL MALFUNCTIONS

Should any of these malfunctions occur, and the parachutist's rate of descent increases in comparison to other parachutists, the reserve parachute is activated, using the down-and-away method.

- Place the left hand over the rip cord protector flap, fingers extended and spread. Apply pressure to prevent canopy from deploying.
- Pull the rip cord handle with the right hand and drop it.
- Use knife edge of the right hand and reach into the pack tray, at the same time working the left hand through the rip cord protector flap, and grasp as much canopy as possible.
- Keep feet and knees together.
- Throw canopy down and away from the body in the same direction as the spin.
- Immediately free all suspension lines.
- If the parachute does not deploy, pull it in and throw it again in the same manner.

a. Partial malfunction indicators are:

(1) Complete inversion.

(2) Semi-inversion.

(3) Blown section or gore.

(4) More than six broken suspension lines.

(5) Hole larger than the apex vent.

b. If the reserve canopy does not inflate, gather in as much of it as possible and throw out again. If the reserve

parachute becomes entangled in the suspension lines of the main parachute or with the equipment, or fails to function, immediately assume the landing attitude and prepare to execute a parachute landing fall.

c. When the reserve parachute activates, there are two inflated canopies – the parachutist has no directional control over his parachute. All other parachutists slip clear. To assume the proper landing attitude, reach high on all four risers of the main parachute, and maintain this attitude until making ground contact. Immediately upon landing, release the main parachute (using the canopy release assemblies) and collapse the reserve by using either the quick-recovery method or by detaching the connector snaps from the D-rings of the main lift web.

2-10. COLLISIONS

Parachutists use the spread-eagle method to bounce off another canopy (or suspension lines) when a collision in midair is imminent. If a parachutist enters another parachutist's suspension lines, the entering parachutist assumes the modified position of "attention" with the right hand protecting (but not grasping) the rip cord grip, in hope that he will exit the same location without becoming entangled. If not, the entering parachutist may use his left hand to assist in exiting the other jumper's canopy and suspension lines.

2-11. ENTANGLEMENTS

If parachutists become entangled, the actions taken by each one depend upon the type parachute used. Reaction tech-niques are as follows.

a. **T-10C Parachute.** The higher parachutist moves hand under hand down to the lower parachutist. They attempt to establish eye-to-eye contact and hold onto each other by the main lift web(s). They decide which parachute landing fall to execute upon contact with the ground and both parachutists will execute the same PLF. If they are face-to-face, they will not execute a front PLF. If they are back-to-back, they will not execute a rear PLF. If one parachutist has a completely inflated canopy, neither parachutist activates the reserve parachute. If both parachutes lose lift capabilities, they activate their reserve parachute (using the pull-drop method).

b. **MC1-1B/C Parachute.** When entangled, both parachutists immediately activate their reserve parachute using the down-and-away method. Neither parachutist attempts to climb to the other parachutist. The higher parachutist avoids the lower parachutist when landing.

2-12. EMERGENCY LANDINGS

Depending upon the type of emergency landing initiated, the parachutist performs specific actions, which are explained herein.

a. **Tree Landing.** The parachutist –

(1) Attempts to avoid the obstacle.

(2) Retains combat equipment (if not already lowered).

(3) Checks below, then jettisons combat equipment (if already lowered).

(4) Maintains canopy control until making contact with trees.

(5) Rotates forearms in front of his face and chest when making contact with trees.

(6) Prepares to execute PLF if passing through trees.

(7) Considers the possibility of activating the reserve parachute and climbing down the outside of it if hung up in trees.

b. **Wire Landing.** The parachutist –

(1) Attempts to avoid the obstacle.

(2) Lowers, checks below, then jettisons combat equipment.

(3) Raises both arms to the elbow-locked position and places the palms of the hands on the inside of the front set of risers before contact. The feet and knees are together (bend in knees is exaggerated).

(4) Pushes forward on the front set of risers, bending at the waist, initiating a rocking motion, and attempts to work through the wires.

(5) Prepares to do a PLF if passing through the wires.

c. **Water Landing Without Life Preserver.** The parachutist –

(1) Attempts to avoid the water (lake or river).

(2) Jettisons headgear.

(3) Releases all equipment tie-downs and lowers equipment. (Equipment not rigged for lowering [except individual weapons] should be jettisoned.)

(4) Activates quick release on the waistband.

(5) Unsnaps the left connector snap on the reserve parachute.

(6) Rotates the reserve to the right side of the parachute harness.

(7) Seats himself well into the harness.

(8) Activates the quick-ejector snap on the chest snap.

(9) Places hands on quick-ejector snaps on the leg straps.

(10) Activates the quick-ejector snaps on the leg straps, throws arms up, and arches out of the harness when entering the water.

(11) Attempts to execute a PLF if the water is shallow.

(12) Swims upstream if the water is deep.

d. **Water Landing With Life Preserver.**

(1) Emergency water landings could occur on a tactical training mission where the route to the DZ is over a large body of water. On such flights, life preservers are issued to parachutists. If the aircraft malfunctions, it may be necessary that the parachutists jump over the water.

(2) Emergency water landings require parachutists to leave any combat equipment on board the aircraft so they do not become entangled in it in the water.

(3) Deliberate water landings are executed for training in selected water drop zones (Part Four). No combat equipment is worn by the parachutists.

(4) The inflatable life preserver (B-7) is worn under the harness with the inflatable portions under the parachutist's armpits.

(5) During the descent, the parachutist inflates the life preserver by discharging the attached CO2 cartridges. If necessary, inflation can be effected by blowing air into an inflation valve hose.

(6) Upon entering the water, the parachutist activates both cable loop-type canopy release assemblies and swims away from the canopy.

2-13. RESERVE ACTIVATION INSIDE AIRCRAFT

If the reserve parachute is activated inside an aircraft, the aircrew must follow the procedures explained herein.

a. **Fixed-Wing Aircraft.** If the parachutist is aft of the wheel well, with the jump doors (or ramp) open and the reserve canopy is in or going out the door (or ramp), the jumpmaster and safety personnel make no attempt to retain the parachutist inside the aircraft.

(1) The area is cleared, if possible, and the parachutist exits immediately. If the canopy is not in the door (or ramp), the deployed reserve canopy is secured as quickly as possible by anyone nearby. Then, the parachutist is moved to the forward section of the aircraft, the open reserve is removed, another reserve is attached (if available), and the parachutist is returned to the stick to jump.

(2) If the parachutist is forward of the wheel well, and the jump doors (or ramp) are open, the parachutist either steps on or grasps the reserve canopy and traps it so it cannot inflate. Safety personnel move the

parachutist to the forward section of the aircraft. They remove the reserve and attach another reserve (if available), and return the parachutist to the stick to jump.

(3) If the jump doors (or ramp) are closed and a reserve parachute deploys, the jumpmaster or safety personnel move the parachutist to the forward section of the aircraft. The deployed reserve is removed, and the loadmaster is told not to open the jump doors (or ramp). Another reserve (if available) is attached, and the parachutist is returned to the stick to jump.

b. **Rotary-Wing Aircraft.** If the reserve parachute is activated in an aircraft that requires the parachutist to sit in the door, no attempt is made to stop the parachutist from exiting the aircraft. The parachutist immediately exits. In an aircraft that requires parachutists to exit over the ramp, follow the procedures described for fixed-wing aircraft in paragraph a.

CHAPTER 3

DUTIES AT THE DEPARTURE AIRFIELD

Time is a critical factor at the departure airfield. Events must occur at the same time to meet station time.

- **DACO/jumpmaster update briefing.**
- **Aircraft inspection and coordination with aircrew.**
- **Parachute issue.**
- **Rigging/inspection of parachutists.**
- **Loading of aircraft.**

The jumpmaster usually turns control of the chalk (planeload) over to the assistant jumpmaster and safeties while he accomplishes update briefings, aircraft inspection, and aircrew coordination. The assistant jumpmaster and safeties control parachute issue, and prepare for rigging/inspection of the chalk (load).

Section I. KEY PERSONNEL

3-1. PRIMARY JUMPMASTER/ASSISTANT JUMPMASTER

Upon arrival at the airfield, the jumpmaster reports to the departure airfield control officer for an update briefing to include:

- Change in the station time.
- Change in the overall operation plan.
- Current weather and winds.
- Parking plan of aircraft (location and tail number of the assigned aircraft).

- Coordination with the USAF guide if wheeled vehicles are used for transport to aircraft.

a. Normally the manifest is distributed as follows (Figure 3-1):

(1) DACO—original plus one copy.

(2) Pilot or his representative—one copy.

(3) Parachute issue—one copy.

(4) Jumpmaster—one copy.

(5) Unit suspense—one copy.

b. After DACO coordination, the jumpmaster should proceed to the aircraft(s) for initial coordination. Normally, the aircraft is open with a crew member on board one hour

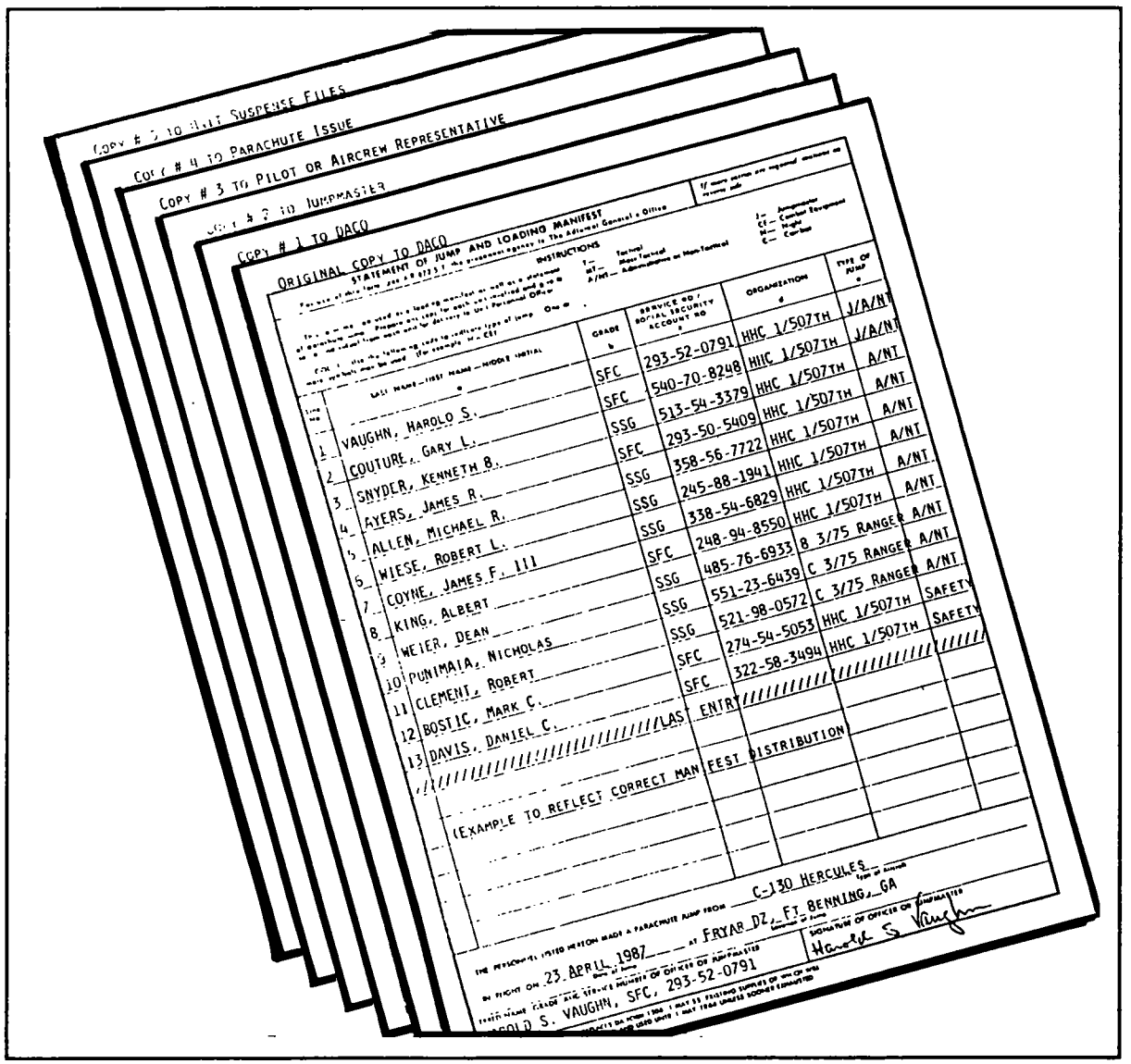
COPY # 1 TO DACO
ORIGINAL COPY TO DACO
STATEMENT OF JUMP AND LOADING MANIFEST
COPY # 3 TO PILOT OR AIRCREW REPRESENTATIVE
COPY # 4 TO PARACHUTE ISSUE
1 VAUGHN, HAROLD S. SFC 293-52-0791 HHC 1/507TH J/A/NT
2 COUTURE, GARY L. SFC 540-70-8248 HHC 1/507TH J/A/NT
3 SNYDER, KENNETH B. SSG 513-54-3379 HHC 1/507TH A/NT
4 AYERS, JAMES R. SFC 293-50-5409 HHC 1/507TH A/NT
5 ALLEN, MICHAEL R. SSG 358-56-7722 HHC 1/507TH A/NT
6 WIESE, ROBERT L. SSG 245-88-1941 HHC 1/507TH A/NT
7 COYNE, JAMES F. III SFC 338-54-6829 HHC 1/507TH A/NT
8 KING, ALBERT SSG 248-94-8550 B 3/75 RANGER A/NT
9 WEIER, DEAN SSG 485-76-6933 C 3/75 RANGER A/NT
10 PUNIMAIA, NICHOLAS SFC 551-23-6439 C 3/75 RANGER A/NT
11 CLEMENT, ROBERT SFC 521-98-0572 HHC 1/507TH SAFETY
12 BOSTIC, MARK C. 274-54-5053 HHC 1/507TH SAFETY
13 DAVIS, DANIEL C. 322-58-3494 HHC 1/507TH
LAST ENTRY
(EXAMPLE TO REFLECT CORRECT MANIFEST DISTRIBUTION
C-130 HERCULES
23 APRIL 1987
FRYAR DZ, FT. BENNING, GA
HAROLD S. VAUGHN, SFC, 293-52-0791

Figure 3-1. Manifest distribution.

before station time. Items to be discussed/verified/agreed to:

(1) *Aircraft configuration.* The aircraft should be configured IAW the requesting unit mission (see Chapter 11). If the aircraft has the wrong configuration, the requesting unit has the option to accept or reject it. If the mission request asks for both doors to be open for a mass troop drop but one door is inoperative (inflight or on the ground), the requesting unit has the option to continue the mission using one door or to abort the mission.

(2) *Control of the jump doors.*

(3) *Drop altitude, speed, and heading.*

(4) *Racetracks.*

(5) *Towed parachutist procedures (in detail).*

(6) *Emergency actions on board.*

(7) *Time warnings and checkpoints.*

(8) *Type of drop, for example, CARP, GMRS, VIRS.*

(9) *Load time.*

(10) *Station time.*

(11) *Takeoff time.*

(12) Initial contact time with CCT or DZST for update on DZ conditions (if communications are being used).

(13) *Drop time.*

(14) *Additional details.*

(a) If a ground abort occurs, designate which key personnel on board must be advised.

(b) If the jumpmaster is not the last parachutist, designate who is in command of the troops on board in an emergency.

(c) Emphasize to the aircrew the importance of accurate direction and velocity of DZ winds (before the one-minute time warning) and accurate time warnings.

(d) Ensure parachutists raise and fasten seats.

c. The jumpmaster, accompanied by a crew member (usually the USAF loadmaster) inspects the aircraft and coordinates any activities peculiar to the airborne operation. The jumpmaster must check the exterior and interior

portions of the aircraft directly related to the airborne operation.

3-2. SAFETY PERSONNEL

While the jumpmaster inspects the aircraft, safety personnel control the chalk, making sure personnel remain in assigned stick-door position at all times. Personnel must also be accounted for at all times.

a. **Parachute Issue.** Safety personnel take the chalk for parachute and air items. They draw extra aviator kit bags and at least two extra reserve parachutes. The extra kit bags are used to store the static lines and deployment bags after the jump (they are placed in or with the jumpmaster kit bag).

b. **DA Layout Inspection.** All air items and combat equipment should be displayed for inspection by safety personnel before donning or loading on the aircraft.

c. **Parachutes and Equipment.** Safety personnel ensure that all parachutists use the buddy system when donning parachutes and equipment. Personnel should not start donning parachutes and equipment earlier than one hour before load time to avoid unnecessary time in the harness.

d. **Coordination.** If directed by the jumpmaster, safety personnel report to the DACO for any special or last-minute instructions that must be passed to the jumpmaster.

e. **Jumpmaster Personnel Inspection.** Safety personnel assist in rigging, inspecting, and correcting deficiencies as directed by the jumpmaster.

Section II. JUMPMASTER PERSONNEL INSPECTION

The jumpmaster is responsible for the inspection of his parachutists before an airborne operation. Only by a complete and systematic equipment inspection of each parachutist can the jumpmaster ensure that personnel aboard his aircraft are safe to jump.

3-3. HANDS-ON INSPECTION

During the inspection, the jumpmaster uses a control hand and working hand. During the course of the inspection, the control hand and working hand may change. The control hand remains stationary, while the eyes follow the working hand. The principle is to look at what is touched. When locations are described in this sequence (top right, left), it is in relation to the parachutist—not the jumpmaster. The word "trace" describes the working hand moving along the item being inspected to ensure that it is not twisted, cut, frayed, or misrouted. When

tracing metal items, the jumpmaster is inspecting for sharp edges and proper assembly.

3-4. TYPES OF INSPECTIONS

The sequence described herein is a typical combat parachutist rigged with LBE (exposed), ALICE pack, M1950 weapons case, and main and reserve parachutes. Other items of equipment and combinations thereof are prescribed in Chapter 6. When performing JMPI on these items, the jumpmaster starts at the point of attachment to the parachute harness and completely inspects that item before proceeding with the remainder of the inspection sequence.

Section III. JUMPMASTER PERSONNEL INSPECTION SEQUENCE

The procedures for personnel inspection is explained in this section.

3-5. HELMET (FRONT), M1

Place both hands on the rim of the helmet, on the right side, palms facing the parachutist. Using the right hand as the working hand and the left hand as the control hand, trace the rim of the helmet with the working hand to the opposite side of the helmet. Insert the thumb of each hand under the edge of the helmet and feel the short portion of the helmet strap. Ensure the short portion on each side is snapped to the snap button on the inside of the helmet liner.

a. Tilt the parachutist's head back and look at the headband. Ensure that the leather portion is against the parachutist's head, and that the openings of the metal attaching clips are toward the crown of the helmet. Place the index finger of the working hand on the short portion of the helmet strap. Ensure it is routed from the inside to the outside over the metal horizontal bar on the helmet.

b. Trace down the helmet strap ensuring it is not twisted, cut, or frayed, and that it is routed from the inside to the outside under the horizontal bar of the V-webbing. Continue to trace down to the point of connection. Ensure that the concussion ball has been removed, and the metal claw faces away from parachutist's face.

c. Continue to trace the long portion of the helmet strap to the horizontal bar of the V-webbing on the opposite side, ensuring that it is routed from the inside to the outside.

d. Finish the inspection of the helmet strap by tracing to the metal horizontal bar on the helmet, ensuring that it is routed from the inside to the outside. Place the same index finger on the point of attachment for the chin

strap (metal-buckle). Ensure the chin strap is properly secured to the metal buckle. If the chin strap is adjusted in the second eyelet, it must be routed under both sides of the buckle. Trace the long portion of the chin strap under the parachutist's chin to the point of attachment on the opposite side. Ensure that it is not twisted, cut, or frayed, and is properly routed and secured to the metal buckle.

e. Finally, trace the short, sewn-in portion of the chin strap across the front of the parachutist's chin.

3-6. HELMET (FRONT), STANDARD A (BALLISTIC)

Place both hands on the rim of the helmet, on the right side, palms facing the parachutist. Using the right hand as the working hand and the left hand as the control hand, trace the rim of the helmet with the working hand to the opposite side of the helmet. Insert the thumb of each hand under the edge of the helmet and feel for the locking nuts.

a. Tilt the parachutist's head back and look at the headband. Ensure that the smooth leather portion is toward the parachutist's head and the openings of the metal attaching clips are down, visible, and secured. Place the index finger of the working hand on the pull-the-dot fastener with tab. Ensure that it is a serviceable pull-the-dot fastener in that there are four plies of nylon, three of which must run through the snap portion.

b. Bypass the pull-the-dot fastener with tab and trace down to the point of attachment for the chin strap. Ensure the chin strap is properly secured and that the parachutist retention strap is routed under the adjusting buckle and around the chin strap.

c. Continue to trace the long portion of the chin strap down under the parachutist's chin and back up to the point of attachment on the opposite side. Ensure the chin strap is properly secured and that the parachutist's retention strap is routed under the adjusting buckle and around the chin strap.

d. Finally, trace the short, sewn-in portion of the chin strap across the front of the parachutist's chin.

3-7. CABLE LOOP-TYPE CANOPY RELEASE ASSEMBLIES

Look at the left cable loop-type canopy release assembly. Tape it with the knuckles of the right hand (the left hand is still on the helmet). Ensure that it sounds solid. Turn the left cable loop-type canopy release assembly one-quarter turn out and look at it closely. Ensure that it is properly assembled and has no cracked components. Repeat this same procedure for the right cable loop assembly, using the left hand.

3-8. CHEST STRAP

At the same time, trace down both sides of the main lift web to the chest strap.

Ensure that the chest strap is not misrouted around the main lift web. Place the right hand (palm toward jumpmaster, fingers extended and joined, and pointing up) behind the chest strap next to where it is sewn into the main lift web. Trace the chest strap, ensuring it is not twisted, over to the quick-fit V-ring. Ensure that the quick-fit V-ring is inserted into the quick-ejector snap. With the thumb of the right hand, press in on the locking lever of the quick-ejector snap to ensure it is properly seated over the spring-loaded ball detent.

3-9. WAISTBAND

Move to the right side of the parachutist. Grasp the top carrying handle of the T-10 reserve parachute with the right hand. Place the left hand (palm away from the parachutist, fingers extended and joined, and pointing up) behind the waistband next to the pack tray. Look at the stitching where the waistband is sewn to the pack tray. Ensure that it is not frayed or torn (more than one-half way).

a. With the left hand, trace the waistband forward, ensuring it is not twisted, cut, frayed, or misrouted under the horizontal backstrap. Ensure that the waistband is routed over the main lift web and under the right D-ring. Move to the front of the parachutist.

b. Place the left hand on the parachutist's chest (palm facing the parachutist's chest). With the right hand, pull the reserve away from the parachutist and look at the waistband where it passes in back of the reserve. Ensure that it is routed through both waistband retainers on the reserve and that it is not twisted, cut, or frayed.

c. Remove the left hand from the parachutist's chest and, reaching under the right arm, grasp the left carrying handle of the T-10 reserve with the left hand (palm facing away from the reserve). Release the top carrying handle of the reserve with the right hand and move to the left side of the parachutist. Place the right hand (fingers extended and joined, pointing up, and the palm facing away from the parachutist) under the waistband as close to the left D-ring as possible. Trace it back to the metal adapter and stop.

d. Remove the left hand from the left carrying handle and insert the index and middle fingers of the left hand into the quick release of the waistband, ensuring that it is a two- to three-finger quick release, and that it is not a false quick release. Trace the free, running end of the waistband with the left hand, then regrasp the left carrying handle of the reserve with the left hand.

e. With the right hand, trace the waistband adjuster panel back to the

pack tray, ensuring it is not twisted, cut, frayed, or misrouted under the horizontal backstrap. Also, ensure that it is not frayed or torn (more than one-half way) where it is sews to the pack tray.

3-10. WEAPONS CONTAINER, M1950

Begin the inspection of the weapons container at its point of attachment on the left D-ring.

a. Push out on the weapons container with the right forearm. Look at the quick-release snap on the M1950 weapons container to ensure it is attached to the left D-ring to the outside of the D-ring attaching strap for the ALICE. With the index finger of the right hand, push in and release the opening gate (safety gate) to ensure that it is spring-loaded, facing the parachutist's body, and not safe-tied. Push on the activating arm to ensure that it is properly seated between the spring-loaded ball detents. Trace down to the V-ring to ensure the quick-release link has been routed through the V-ring. Continue to trace down the inside of the M1950 weapons container to the adjustment strap. Ensure the adjusting strap has been properly routed through the appropriate set of adjusting strap connectors and that a half hitch has been placed in the adjusting strap.

b. Next, check the lower tie-down on the weapons container, ensuring that it is routed around the M1950 weapons container and the parachutist's leg, and fastened or tied off on the front leading edge of the M1950 weapons container in a bowknot (when jumping the right door, the lower tie-down is routed and fastened or tied off by the jumpmaster after he completes the entire JMPI). Sweep across the bottom of the weapons container with the right hand to ensure the rifle muzzle does not protrude. Place the index finger of the right hand on the slide fastener. Check it to ensure it is properly secured by tracing it all the way up to the lift-the-dot snap. Ensure that the slide fastener is stopped approximately 1 to 7 inches from its uppermost position and that the tab thong has been separated over the lift-the-dot post. If the lift-the-dot snap is unserviceable, the upper tie-down may be routed through the slide fastener tab thong.

c. Slap the M1950 weapons container about 12 inches down from the top with the right hand; the forward assist of the M16 rifle, or the carrying handle of the M249 SAW, should be felt. This ensures that the weapon has been properly inserted into the weapons container.

d. Finally, trace the upper tie-down, ensuring that it is routed around the M1950 weapons container and the main lift web, above the chest strap, and tied off in a bowknot on the front leading edge of the M1950 weapons

container. This completes the inspection of the weapons container.

3-11. WEAPONS CONTAINER, M1950 (RIGGED FOR LOWERING)

The M1950 weapons container can be rigged for lowering of a single item or a tandem load.

a. **Rigged for Lowering a Single Item of Equipment.** The inspection of the M1950 weapons case begins the same: left hand in the left carrying handle of the reserve, fingers spread, and the right index finger on the snap fastener, quick-release snap.

(1) Ensure that the quick-release snap is positioned to the outside of the connector snap on the D-ring attaching strap with the opening gate facing the parachutist. Rotate your index finger around to the opening gate and pluck it to ensure it has spring tension. Focus on the activating arm of the quick-release snap. Ensure that the safety tie is not present, and that the quick-release link is not routed through the metal V-ring.

(2) Place your index finger on the girth hitch of the HPT lowering line, ensuring it is tight around the metal V-ring. Continue to inspect the M1950 weapons case from the adjusting strap connection, feeling for the forward assist. After slapping the main body of the M1950 weapons case, focus on the lowering line stow pocket. Ensure that both the looped-end HPT lowering line and the lowering line ejector snap are protruding from the top of the lowering line stow pocket. The HPT lowering line must be stored with the entire retainer flap in the lowering line stow pocket, and the lift-the-dot fastener must be present and secured.

(3) Trace the HPT lowering line up to the lowering line quick-ejector snap, pulling the M1950 weapons case toward the front of the parachutist. The lowering line quick-ejector snap is attached to the lowering line adapter web if present. If not, it is the outermost item on the left D-ring of the parachute harness. The opening gate must be facing the parachutist and the yellow safety line lanyard. Tug downward on the lowering line quick-ejector snap to ensure it is secured properly; then move to the upper tie-down, and ensure it is routed and secured properly.

(4) Continue the inspection beginning with the reserve parachute.

b. **Rigged for Lowering as a Tandem Load.** Inspection of the M1950 weapons case begins the same as in paragraph a. Ensure the safety tie is not present.

(1) Continue the inspection up to the retainer flap of the HPT lowering line. Trace the HPT lowering

line up to the M1950 weapons case. Ensure the HPT lowering line has been routed from front to rear behind the Type VIII reinforced cotton webbing of the M1950 weapons case to the parachutist's front.

(2) Continue tracing the HPT lowering line to the lowering line quick-ejector snap, then continue the sequence beginning with the leg straps as already described.

3-12. RESERVE PARACHUTE

Grasp the top carrying handle with the left hand and pull up and out slightly. With the right hand, check the left connector snap to ensure that it is secured to the left D-ring and that it is spring-loaded and not safetied. Switch hands. Pull up and out slightly with the right hand. With the left hand, check the right connector snap to ensure it is properly secured to the right D-ring. Pull on the safety wire to ensure that it is routed through the connector snap, and that the safety wire is attached to the reserve by a nylon laynard. Feel the inside to ensure the safety wire is bent over.

a. Form a knife edge with the left hand and sweep between the reserve and the rip cord grip to ensure that the rip cord grip is not winterized and that the pack opening spring band is not misrouted over the rip cord grip. Insert the index finger of the left hand into the rip cord grip stow pocket to ensure that the steel swage ball is present. Then, with the right index finger and thumb, seat the locking pins and cables, ensuring that the cables are not frayed and the pins are not bent or corroded.

b. Look at the cones, grommets, and pack fasteners to ensure that there is no exposed canopy or suspension lines. Close the rip cord protector flap and check the pack opening spring bands in the following order: top two, bottom two, left then right (one at a time, either hand). Pull each one out slightly and inspect for serviceability, proper routing, and spring tension (pay special attention to the right pack opening spring band to ensure that it is not misrouted over the rip cord grip).

c. Do an overall inspection of the T-10 reserve. Place both hands on the top right corner of the reserve. The left hand is the control hand and stays in place. With the working hand (right hand), sweep across the top, down the left side, across the bottom, lifting the reserve up to obtain a clear view, and up the right side; lift the left hand and sweep across the top right corner where the control hand (left hand) has been.

d. Ensure that there is no exposed canopy, oil, excessive dirt, or tear(s) in the pack tray. Also, when checking the right side, ensure that there is no right carrying handle.

3-13. ALICE PACK WITH H-HARNESS AND HPT LOWERING LINE

After the jumpmaster has completed the overall inspection of the reserve parachute, he lifts up on the reserve and issues the command HOLD. He then inspects the ALICE pack as follows.

a. Place the index finger of the left hand on the snap hook of the right D-ring attaching strap. Ensure the snap hook is to the outside of the right connector snap of the reserve. Check the opening gate to ensure it has spring tension. Trace the right D-ring attaching strap down to where it is attached to the friction adapter. Check to ensure that there is a two- to three-finger quick release and that the quick release is on the front side of the left D-ring attaching strap and the free running end is hanging freely on the ALICE pack.

b. Repeat the process for the left D-ring attaching strap, using the right hand. With both hands, trace the H-harness down to where it disappears under the frame of the ALICE pack. Raise the ALICE pack and give the command, HOLD. Continue to trace the H-harness down to the quick release, ensuring that they are adjusted two to three fingers, and all excess webbing is rolled and secured with retainer bands/masking tape and hanging free.

c. Proceed to the girth hitch of the HPT lowering line assembly. Ensure that it has been attached to the X formed by the H-harness from top to bottom and around both 84-inch straps. With the right hand, trace the HPT lowering line to the left side of the ALICE frame, ensuring that it is routed over the shoulder carrying strap.

d. Look at the retainer flaps. Ensure that no more than 1/4 inch of the folds extends beyond the retainer flaps, and that both hook tabs are present and secured. Continue to trace the lowering line, ensuring that the quick-ejector snap has been routed behind the cotton chape on the M1950 weapons container and properly attached to the lowering line adapter web. If the lowering line adapter web is not present, it may be attached as the outermost item on the left D-ring.

e. Check to ensure that the additional leg tie-down is present on the right side of the ALICE pack frame, if jumping the left door; if jumping the right door, a lower tie-down is also needed if not jumping the M1950 weapons container. The ALICE pack lower tie-down, either right or left, is secured after completion of the inspection of the entire parachutist.

3-14. ALICE PACK WITH HARNESS SINGLE-POINT RELEASE AND HPT LOWERING LINE

After the jumpmaster has completed the overall inspection of the reserve

parachute, he lifts up on the reserve and issues the command HOLD. He then inspects the ALICE pack.

a. Place the index finger of the left hand on the snap hook of the right attaching harness strap. Ensure the snap hook is to the outside of the right connector snap of the reserve. Check the opening gate to ensure it has spring tension. Trace the right attaching harness strap down to the triangle link.

b. Individually check the proper routing of the attaching loops, ensuring the white loop is routed through the triangle link on the attaching harness strap. The OD loop is routed through the white loop and the red loop through the OD loop and the grommet on the adjustable leg strap. Ensure the release handle cable is routed through the red loop and the cable loop retainer.

c. Repeat the same procedure for the left attaching harness strap using the right hand. Check the release handle assembly, ensuring it is properly attached to the cross strap and release handle attachment and that the handle retainer lanyard is not misrouted.

d. With both hands, trace down the harness between the cargo pouches on the ALICE pack to the adjustable cross strap, ensuring it is below the center cargo pouch. Pull on the free running end of the adjustable cross strap to ensure all slack has been removed. Lift up on the ALICE pack and command HOLD.

e. Ensure the free running ends of the harness and leg straps are routed under the top of the frame and envelope cushion portion of the ALICE pack. Inspect the shoulder carrying straps to ensure they are snug tight and that free-running ends are taped or tied off so no slack is hanging free. Trace the free running ends of the harness, ensuring they cross (forming an X) down to the friction adapters. Ensure they are properly routed through the friction adapters and a two- to three-finger quick release is present. The excess free running ends of the harness are checked to ensure they are S-folded and secured with retainer bands, or tape.

f. If the parachutist is less than 5 feet, 9 inches, the leg straps must be routed under the frame (inside to outside) above the crossbar of the ALICE frame (as worn); if taller than 5 feet, 9 inches, the leg straps must be routed below the crossbar. Complete the inspection of the lowering line in the same manner as the ALICE with H-harness.

3-15. LEG STRAPS

Insert the index and middle fingers of both hands under the leg straps right below the aviator's kit bag. Place the thumbs on the top of the leg straps and trace both leg straps back to the saddle simultaneously. Ensure that the leg straps are not misrouted around the saddle.

a. With the left hand, trace the right leg strap forward to the quick-fit V-ring. Ensure that the leg strap is not twisted, cut, or frayed. Push in on the locking lever of the quick-ejector snap to ensure it is properly seated over the spring-loaded ball detent. Then, trace the left leg strap with the right hand the same way, ensuring that the left leg strap is routed through the exposed aviator's kit bag handle over the bottom and under the top.

b. Continue to trace to the quick-fit V-ring. Push in on the locking lever of the quick-ejector snap to ensure it is properly seated over the spring-loaded ball detent. Ensure that the sewn, reinforced portion of the aviator's kit bag is toward the jumpmaster and the smooth portion is facing the parachutist. Before standing up, tap the parachutist on the thigh and command STAND ERECT.

3-16. STATIC LINE

If the static line has not been routed over the parachutist's shoulder, route it at this time. The following explanation is for the static line when routed over the right shoulder. For the left shoulder, the hands are reversed.

a. With the right hand, reach diagonally across the body and grasp the static line snap hook. Pull up on the static line snap hook and ensure that it is attached to the top carrying handle of the reserve parachute. Open the palm and look at the static line snap hook. Make sure the hole for the safety wire is present.

b. Regrasp the static line snap hook and, with the left thumb and index finger, pull out on the static line snap hook safety wire and lanyard. Ensure that the lanyard is attached to the looped portion of the static line and not to the static line snap hook. Also, look at the safety wire and ensure it is not too long, too short, or excessively bent.

c. Grasp the static line above the snap hook with the left hand. Rotate it to the parachutist's right and push it toward the static line snap hook, exposing the inside of the looped portion of the static line. Look inside the looped portion of the static line to ensure that it is not cut or frayed. Rotate the looped portion of the static line 180 degrees and inspect it again in the same manner for cuts or frays.

d. Remove the left hand from the static line. With the index finger and thumb of the right hand, form an O around the static line just above the snap hook. Give the parachutist the command TURN. As the parachutist turns, raise the right hand to inspect the static line for cuts, frays, or burns. When the parachutist has completed his turn, the hand should be high enough to have pulled all the slack from the static line slack retainer.

e. With the left hand, make a physical check of the static line from the working hand down to the first stow to

ensure proper routing, and that the static line is not cut, frayed, or burned. Then, form a bight in the static line and restow it into the static line slack retainer. Pull all the slack through the static line slack retainer. Flip the slack on top of the main parachute and control it with the right hand. Pick up the static line at the first stow and pull it back. Ensure that it is not misrouted around the retainer band keeper or pack tray, and no cuts, frays, or burns are present.

f. Place one or two fingers behind the static line (from bottom to top, fingers pointing up) and trace over to the other retainer band keeper. Pull out on this stow and inspect it in the same manner as on the other side. Repeat this procedure until the entire length of static line has been inspected. Ensure that the pack opening loop is positioned between the 6 o'clock and 9 o'clock positions.

g. Insert the index finger of the working hand into the pack opening loop from bottom to top and pull out and down on it. Ensure that the pack closing tie is routed through the pack opening loop. Place the index finger on the pack closing tie immediately above the pack opening loop and in a clockwise motion, trace the pack closing tie around to ensure that it is routed through the four pack closing loops. Ensure that the pack closing tie is only one turn of 1/4-inch cotton webbing.

h. Insert the index finger up to the first joint (from bottom to top) under the surgeon and locking knots in the pack closing tie. Ensure that the surgeon and locking knots are between the 3 o'clock and 6 o'clock positions. Pull outward slightly, allowing the surgeon knot and locking knot to pop off the end of the finger. This further ensures that the surgeon and locking knots are secure and that the pack closing tie is not more than one turn of 1/4-inch cotton webbing.

3-17. HELMET (BACK), M1

Place both hands on the rim of the helmet (on the left side as the jumpmaster faces the rear of the parachutist). Using the right hand as the working hand and the left hand as the control hand, trace the outer edge of the helmet with the working hand, checking for sharp or protruding edges, until the working hand reaches the opposite side. With the hands on opposite sides, tilt the parachutist's head forward. Form a hook with each index finger over the adjusting tapes of the neckband and pull down to ensure that they are properly routed and secured. Look at the neckband and ensure the smooth portion is toward the parachutist's head and the rough, sewn portion is toward the jumpmaster. Using the index finger and thumb of either hand, pull down on the shock pad to ensure that it is secured by the center adjusting tape of the neckband and properly inserted into the helmet.

3-18. HELMET (BACK), STANDARD A (BALLISTIC)

Place both hands on the rim of the helmet (on the left side facing the rear of the parachutist), palms facing the parachutist. Using the right hand as the working hand and the left hand as the control hand, trace the outer edge of the helmet with the working hand, checking for sharp or protruding edges, until the working hand reaches the opposite side. With the hands on opposite sides, tilt the parachutist's head forward and look at the parachutist's retention straps. Ensure that they are properly routed (between the helmet shell and the foam impact pad), not twisted, and securely fastened. Using the index finger and thumb of either hand, pull down on the foam impact pad to ensure that it is properly secured inside the helmet.

3-19. RISERS

Standing directly behind the parachutist, place the thumb of each hand under the riser assemblies (from outside to inside). Move both hands as far forward as possible. Firmly grasp each riser assembly. Turn your head to the left and give a slight tug on the right riser assembly (the head is turned away to prevent injury should the riser assembly become unseated). Now, look at the right riser assembly, open the hand to a V-shape, and trace the riser assembly back to the pack tray, ensuring that it is not twisted, cut, or frayed. Turn your head to the right and give a slight tug on the left riser assembly. Repeat the same procedure for the left riser assembly.

3-20. MAIN PARACHUTE PACK TRAY

An overall inspection is performed by placing both hands on the top left corner of the pack tray (palms facing down). The left hand is the control hand and the right hand is the working hand. With the working (right) hand, sweep across the top, down the right side, across the bottom, and up the left side. Lift the control (left) hand and, with the working hand, sweep across the top left corner where the control hand has been. Ensure that there is no mud, dirt, grease, or tear(s) in the pack tray.

3-21. DIAGONAL BACKSTRAPS

Place both hands (fingers extended and joined, palms facing in) behind the pack tray under the diagonal backstrap retainers. Grasp the diagonal backstraps. Look at one, then the other. Ensure that they are both routed over the appropriate shoulder and that the upper one has one more set of stitching visible than the lower one. Now, look at the diagonal backstrap retainers. Ensure that they are routed through the sizing channels in the diagonal backstraps, and routed around the diagonal backstrap keepers on the pack tray. Apply pressure with the thumbs on the pull-the-dot fasteners, ensuring that they are secure. Then, trace the right diagonal backstrap down to the backstrap adjuster (with the left hand).

Next, repeat the same procedure with the right hand on the left diagonal backstrap.

3-22. HORIZONTAL BACKSTRAP

The left hand remains in place as the control hand on the right backstrap adjuster until the inspection is complete. With the right hand, trace the horizontal backstrap down to where it disappears in the main lift web. Bypass the main lift web and pick up the horizontal backstrap where it comes out of it. Give the parachutist the command, BEND FORWARD AT THE WAIST. Continue to trace the horizontal backstrap across the small of the parachutist's back until it disappears in the main lift web on the parachutist's left side. Ensure that it is not twisted, cut, or frayed, that it is routed through both horizontal backstrap retainers, and that the retainers are properly secured. Bypass the main lift web and pick up the horizontal backstrap where it comes out. Continue the inspection up to the control hand (left hand).

3-23. SADDLE

Leaving the left hand in place on the backstrap adjuster, place the right hand on the main lift web on the parachutist's left side (palm facing the parachutist, fingertips pointing down). Trace the saddle across the parachutist's buttocks to the main lift web on the parachutist's right side, ensuring that the saddle is not inverted, twisted, cut, or frayed. Give the parachutist the signal to recover by lighting tapping him on the buttocks.

Section IV. MOVEMENT ON THE AIRFIELD

After personnel inspection, safety personnel load the parachutists aboard the aircraft. Load time is the time agreed on by the Army and Air Force for loading the aircraft. Station time is the time the aircrew, parachutists, and equipment are inside the aircraft and are prepared for takeoff (everyone seated with seat belts fastened and helmets on). (See Table 3-1.)

3-24. PROCEDURES

The following procedures must be adhered to when moving parachutists about an active airfield.

a. Obtain permission (previously coordinated with DACO).
b. Keep parachutists in closed formation.

SITUATION	SIGNAL	ACTIONS IN USAF AIRCRAFT	ACTIONS IN ARMY AIRCRAFT
Crash landing during takeoff.	Continuous ringing of alarm bell or oral warning.	Remain seated until aircraft stops, then exit.	Pull legs inside aircraft, remain in position, cover head with arms.
Crash landing during flight.	Six short rings of alarm bell or oral warning.	Time permitting, JUMP. If not, secure seat belts, brace for impact on continuous ringing, remain seated until aircraft has stopped.	As directed by pilot.
Emergency bailout.	Three short rings of alarm bell or oral warning.	Stand up and hook up on continuous ring; exit aircraft under direction of jumpmaster.	Exit aircraft under direction of jumpmaster.
Ditching over water with insufficient drop altitude.	Six short rings and oral warning.	Use available padding, remain seated, secure seat belts.	Pull legs inside aircraft, remain in position, cover head with arms.
Lighten load.	Oral warning.	Designated parachutist may assist jumpmaster or loadmaster in jettisoning cargo.	As directed by pilot.
Fire in flight.	Oral warning.	Remove parachutists from fire area and extinguish fire.	As directed by pilot.

Rotary-wing aircraft in-flight emergency procedures (all services) are different than the actions shown above and are explained by either the jumpmaster or pilot before boarding the aircraft.

Table 3-1. In-flight emergency procedures.

c. Cross active runways at authorized crossings only.

d. Cross on light signals from airfield control tower only.

- Green (GO).
- Red (STOP, DO NOT PROCEED).
- Flashing red (CLEAR TAXI STRIPS AND RUNWAYS).
- Flashing red and green (EMERGENCY WARNING, BE ALERT).
- Flashing white (RETURN TO STARTING POINT).

e. Display checkered flag on the first and last escort vehicles.

f. Keep vehicles in low gear while crossing runways.

g. Do not raise radio antennas within 50 feet of any aircraft.

h. Do not smoke within 50 feet of any aircraft.

i. Avoid aircraft propellers.

j. Avoid jet engine intakes and exhausts (about 50 feet from intake; 200 feet from exhaust).

3-25. LOADING OF THE AIRCRAFT

The parachutists are loaded in the aircraft in reverse order. During loading, safety personnel move forward in the aircraft ahead of the chalk, and supervise seatingof the chalk to ensure that all seats are filled and that personnel are in proper stick order. They also assist in loading equipment aboard the aircraft. The aircrew briefing may be given before or after loading the aircraft, but must be completed before takeoff. Items normally discussed are listed below.

NOTE: The actions taken are according to service aircraft.

CHAPTER 4

DUTIES IN FLIGHT

As soon as the aircraft takes off, the jumpmaster must remain oriented at all times and keep the parachutists informed. He may coordinate with the navigator or use strip maps or checkpoints. He also remains in communication with the pilot. This is accomplished by relay through the loadmaster over the interphone. On Army aircraft, the jumpmaster or safety personnel should wear a flight helmet or headset for direct communication with the pilot and also should monitor the ground control element.

Section I. RULES

While en route to the drop zone, safety personnel constantly check on the condition of all parachutists. They must be alert for possible airsickness and distribute airsickness bags, which are collected before exiting the aircraft. They also assist the jumpmaster in relocating personnel who are too sick to jump, jump refusals, and other type of no-jumps. If a jump refusal occurs, safety personnel move the parachutist forward in the cargo compartment to be seated.

4-1. JUMPMASTER

General rules stress that the jumpmaster must—

a. Not sacrifice safety for any reason.

b. Rehearse (jumpmaster) procedures on the ground.

c. Hook up before opening jump door(s) or ramp.

d. Face the open jump door or tailgate when in flight.

e. Maintain a firm handhold on the aircraft when working in or close to the open jump door or ramp.

f. Not allow anyone in or near the open jump door without a helmet (or equivalent) and safety harness or parachute.

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4-2. SAFETY PERSONNEL

During in-flight rigging missions, safety personnel assist in parachute issue. They

also operate rigging, JMPI, and correction station as directed by the jumpmaster.

4-3. JUMPMASTER/ASSISTANT JUMPMASTER DUTIES

a. Enforce flight rules and regulations.

b. Issue time warnings.

c. Issue jump commands.

d. Perform door safety checks.

e. Perform outside air safety checks.

f. Control exit of all parachutists.

g. Eject door bundles.

h. Perform in-flight rigging mission.

Section II. JUMP COMMANDS

Each command requires specific actions by each parachutist. When commands are executed properly, they ensure a safe exit from the aircraft.

4-4. CONTROL

To ensure positive control of parachutists inside the aircraft and immediately before exiting, a sequence of nine jump commands is given by the jumpmaster.

a. Commands are given orally with arm-and-hand signals for each command due to aircraft engine noise. The signals are precise, smooth, and coordinated.

b. The commands listed, with minor variations, are employed on all aircraft used for jumping. Jumpmasters ensure that the correct sequence is used for a particular aircraft. Any variations of commands must be explained to the parachutists during the prejump briefing.

4-5. COMMAND AND ARM-AND-HAND SIGNALS

The following sequence of jump commands is used on the C-130 and C-141B aircraft. The commands are given by the jumpmaster.

a. **GET READY.** (First jump command.) Begin at shoulder level, fingers and thumbs extended and joined, palms facing toward the parachutists. Extend both arms forward until elbows lock (keep palms toward the parachutists). Give the oral command, then return to the starting position (Figure 4-1).

This commend alerts the parechutists (seated in the aircreft) and directs their attention to the jumpmester.

The static line is over the appropriete shoulder and fastened to the top cerrying handle of the reserve perachute. (The stetic line snap hook is not removed from the reserve perechute after the jumpmaster inspection or before the command HOOK UP.)

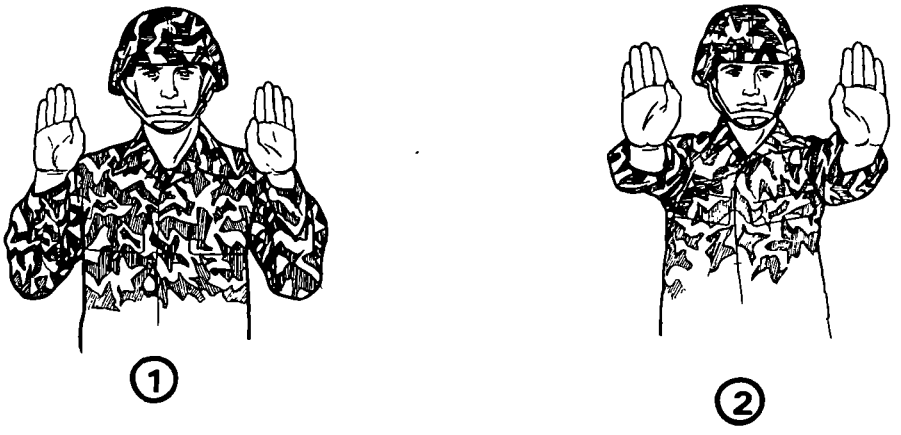


Figure 4-1. Get ready.

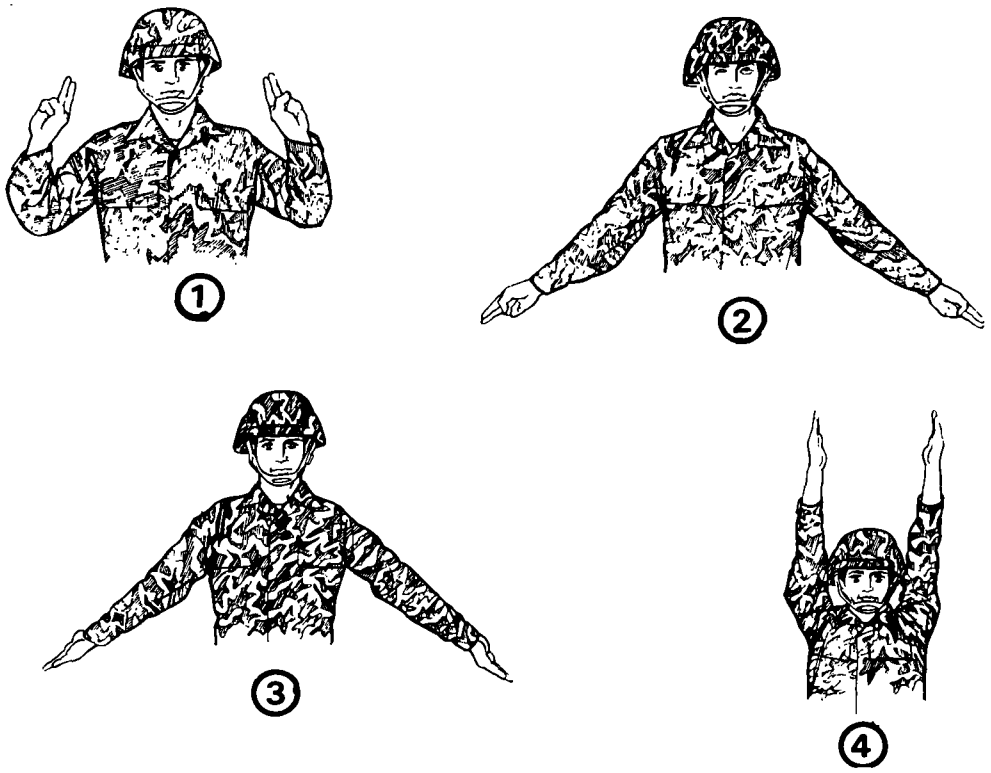
b. **OUTBOARD PERSONNEL, STAND UP.** (Second jump command.) This jump command is executed in two parts.

(1) Start at the shoulders, index and middle fingers extended and joined, remaining fingers and thumbs curled to the palms. Give the command OUTBOARD PERSONNEL, extend the arms down to the sides at a 45-degree angle, and lock elbows.

(2) Give the command STAND UP. Extend and join the fingers and thumb of each hand, rotate the hands so the palms face up, raise the arms straight overhead, keeping elbows locked (Figure 4-2).

c. **INBOARD PERSONNEL, STAND UP.** (Third jump command.) This jump command is executed in two parts.

(1) Start with the hands centered on the chest at shoulder level, extend and join index and middle fingers with remaining fingers and thumb curled to the palm. Give the command INBOARD PERSONNEL, extend the



On this command, parachutists sitting nearest the outboard side of the aircraft stand up, raise and secure the seats, face the jump doors and assume the shuffle position.

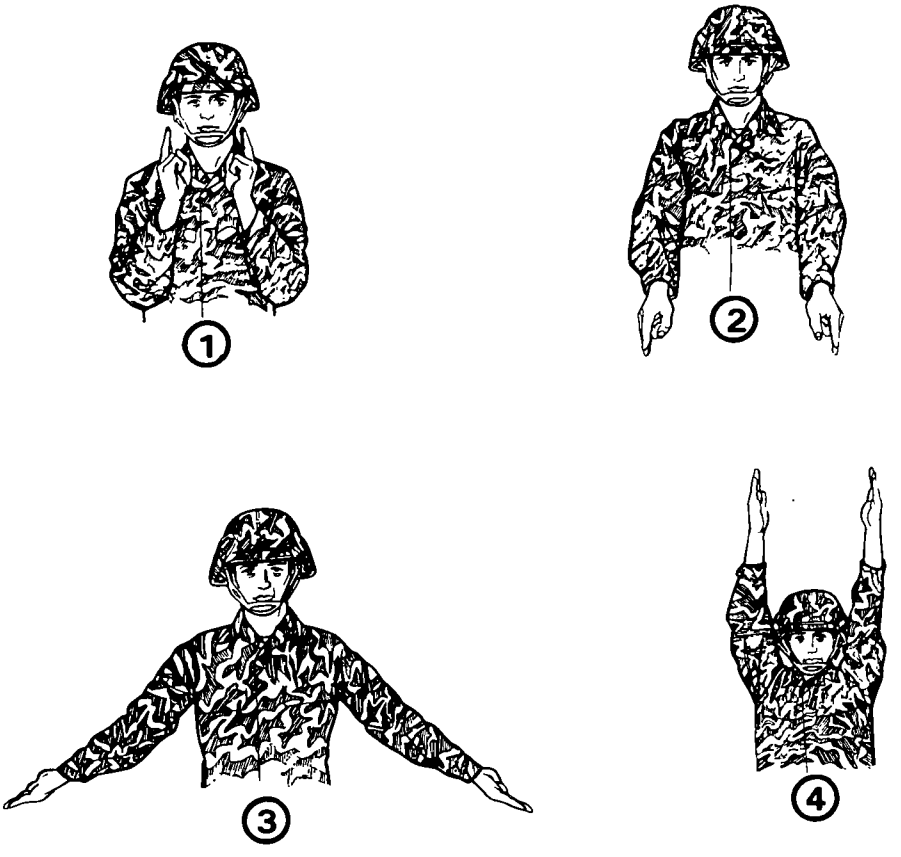
NOTE: The method of releasing the seats from the floor varies depending on the model and year of the aircraft; before takeoff, these devices are inspected and the method of release explained.

Figure 4-2. Outboard personnel, stand up.

arms directly to the front and down at a 45-degree angle, toward the inboard seats.

(2) Give the command STAND UP. First rotate the arms to the sides and down at a 45-degree angle. Then extend and join the fingers and thumb of each hand, rotate the hands so the palms face up, and raise the arms straight overhead, keeping the elbows locked (Figure 4-3).

d. **HOOK UP.** (Fourth jump command.) Begin at shoulder level or with arms extended directly overhead with elbows locked. Form a hook with the



The parachutists seated inboard react the same way as the outboard personnel.

Figure 4-3. Inboard personnel stand up.

index finger of each hand. Form fists with the remaining fingers and thumb of each hand (Figure 4-4). As the oral command is given, move the arms up and down (or down and up) in a pumping motion (a minimum of three times).

e. **CHECK STATIC LINES.** (Fifth jump command.) This is a plural command since there are several static lines attached to the anchor line cable. It begins at eye level, with the thumb and index finger of each hand forming an O. Extend and join the remaining fingers with the palms facing in. As the oral command is given, extend the arms to the front until the elbows are nearly locked, then return to the starting position. Repeat at least three times, ensuring the knife edge of the hands are toward the parachutist and the palms face each other (Figure 4-5).

NOTE: The last two parachutists in each stick must turn (toward the side of the aircraft) and face to the front of the aircraft so that the backpack and static line of the last parachutist may be checked. Each parachutist gives the parachutist to the front a sharp tap, signifying that the static line and backpack have been checked and are safe for jumping.

f. **CHECK EQUIPMENT.** (Sixth jump command.) Start this arm-and-hand signal with the fingertips centered on the chest, palms facing the chest, and fingers and thumb of each hand extended and joined; or with the arms extended to the sides at shoulder

On this command, the parachutists detach the static line snap hook from the top carrying handle of the reserve parachute and hook up to the appropriate anchor line cable with open portion of the snap hook toward the outboard side of the aircraft, ensuring that the snap hook locks properly. (Outboard personnel use outboard cables.) The safety wire is inserted in the hole and folded down. (To protect the eyes, insert the wire by pointing it toward the rear of the aircraft.) A bight is formed in the static line and held at eye level. Personnel jumping the left (right) door have the static line over the left (right) shoulder. (The bight is not released until the parachutist passes the static line to safety personnel.)

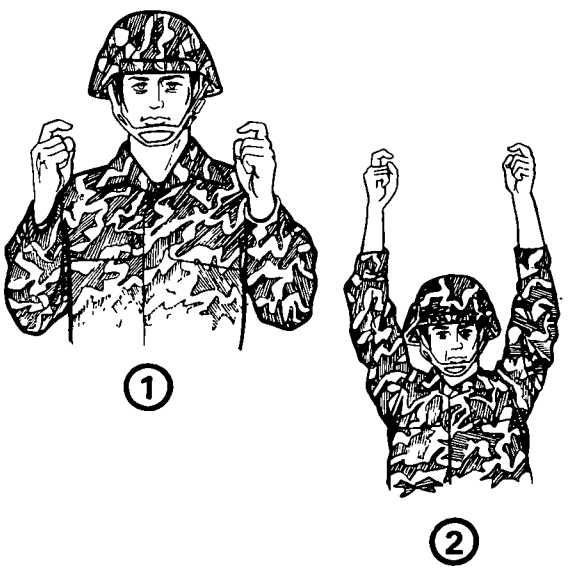


Figure 4-4. Hook up.

Upon receiving this command, parechutists check their individuel static line, and the static line of the parechutist to their front, visuelly end by feeling to determine the following (the bight is not releesed; the free hend is used to perform all checks).

- o Static line snap hook is properly etteched to the enchor line ceble with the safety wire inserted.
- o Static line is free of freys end teers.
- o Static line is not misrouted end is properly stowed on the pack tray.
- o All excess slack in the static line is taken up end stowed in the static line sleck retainer.
- o Peck closing tie is routed through the peck opening loop.
- o Pack tray is intact.

Figure 4-5. Check static lines.

level, fingers and thumbs extended and joined, and palms facing toward the parachutist. Give the oral command, extend arms to the sides at shoulder level, and then return them to the chest; or bend the arms at the elbows, bringing the fingertips to the center of the chest, and then return to the extended position. Repeat at least three times. (The jumpmaster must check his own equipment.) (Figure 4-6.)

①

On this command, each parachutist checks equipment starting at the helmet end works down the front to ensure that all equipment is properly adjusted end safe for jumping. This is done with the free hand es the perechutist maintains a firm grip on the stetic line with the other hand.

②

Figure 4-6. Check equipment.

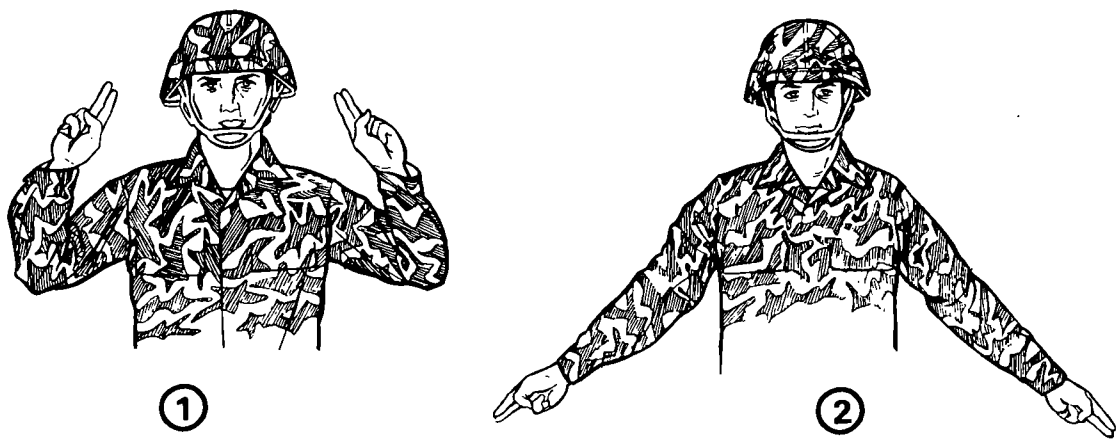
g. **SOUND OFF FOR EQUIPMENT CHECK.** (Seventh jump command.) Cup the hands, placing the thumbs behind the ears which sounding off with the oral command. The hands remain in place until the No. 1 parachutist gives the reply ALL OKAY, JUMPMASTER (Figure 4-7).

NOTE: After the jumpmaster receives ALL OKAY, JUMPMASTER, he regains control of his static line from his safety NCO and takes the No. 1 parachutist position.

h. **STAND IN THE DOOR (C-130), STAND BY (C-141B).** (Eighth jump command.) Starting at the shoulders, extend and join the index and middle fingers, and curl the remaining fingers and thumb of each hand toward the palm. Give the command STAND IN THE DOOR for the C-130, or

On this command, the last parachutist in the outboard stick sounds off saying OKAY, and gives the parachutist in front a sharp tap on the thigh. The signal is continued until it gets to the No. 1 parachutist, who notifies the jumpmaster by pointing to the jumpmaster and saying ALL OKAY, JUMPMASTER. A parachutist who has an equipment problem will notify the jumpmaster by raising the outboard hand above the anchor line cable hookup, palm toward the jumpmaster. The parachutists do not pass this signal. The jumpmaster or assistant jumpmaster either corrects the deficiency or removes the parachutist from the stick.

Figure 4-7. Sound off for equipment check.



STAND IN THE DOOR. On this command, No. 1 shuffles into the door, simultaneously passing the static line to safety personnel, assumes a proper door position, and awaits the command GO.

Figure 4-8. Stand in the door or stand by.

STAND BY for the C-141B, extend the arms down to the sides at a 45-degree angle, and lock elbows (Figure 4-8).

i. **STAND BY.** Parachutists maintain a bight in the static line while maintaining balance with the hand nearest the aircraft fuselage, and await the command GO.

j. **GO.** (Ninth jump command.) The green light is the final time warning on USAF aircraft. It tells the jumpmaster that as far as the aircrew is concerned, conditions are safe and it is time to issue the ninth jump command, GO.

(1) *C-130.* The jumpmaster may tap the first parachutist out. A sharp tap on the thigh is the signal to jump. This signal is part of the jumpmaster's briefing to make its meaning clear. On this command, the parachutist springs up and out the door, and assumes the first point of performance. Each succeeding parachutist shuffles into the door and exits the same way without command.

(2) *C-141.* On the command GO, movement into the door is a normal walking pace without shuffling. Exits are made at an angle of about 20 to 30 degrees toward the rear of the aircraft and are not vigorous (as performed from other type troop carrier aircraft). Parachutists pass the static line to safety personnel, place the hands on the ends of the reserve parachute, and exit.

Section III. DOOR PROCEDURES AND DOOR BUNDLE EJECTION

This is a critical time element for the jumpmaster. All jumpmaster actions must be completed before the "Green Light".

4-6. THE 20-MINUTE TIME WARNING

The jumpmaster(s) unbuckles his seatbelt and stands up (if seated). He moves to the rear of the aircraft, and turns and faces the parachutists. (All time warnings begin and end at the shoulders with closed fists.) He extends both arms straight forward, extending and spreading the fingers and thumb of each hand. This must be repeated twice while the oral command is given.

NOTE: The 20-minute time warning may be increased to 30 minutes aboard the C-141 if the jumpmaster needs more time to accomplish his duties.

4-7. ACTIONS AT 20-MINUTE TIME WARNING

All CWIEs and DMJPs are attached to designated parachutists and are inspected (safety personnel assist the jumpmaster). Door bundles (if any) are unlashed and moved near the jump door(s). Once positioned, the static line of each cargo parachute is attached to the outboard anchor line cable and the following inspection sequence is completed:

- Static line and clevis (safety wire must be bent so that it has metal-to-metal contact).
- Pack closing tie.
- Drogue device (one for C-130; two for C-141).
- Point of attachment to the bundles (risers).
- Tie-down tapes (one on each corner).
- Pack tray and bundle (for any loose or excess webbing).

When the inspection is completed, the jumpmaster slaps the smooth side of the bundle and ensures it is facing the trailing edge of the door(s).

a. The jumpmaster(s) may begin jump commands at the 10-minute time warning using the arm-and-hand signal.

NOTE: The 10-minute time warning may be increased to 15 minutes aboard the C-141 if the jumpmaster needs more time to accomplish his duties.

b. Jump commands normally begin at the 6-minute time warning. When the loadmaster informs the jumpmaster that the aircraft is six minutes from the DZ, the jumpmaster unbuckles his seatbelt and stands up (if seated). He hooks up to the inboard anchor line cable, moves to the rear of the aircraft near the jump door, and transfers control of his static line to safety personnel. He announces "Control my static line" and ensures the safety NCO has positive control before turning to face the parachutists. Safeties stow all excess static line. After inspection of the jumpmaster's static line, safeties move out to inspect the sticks as indicated in paragraph 4-9a.

4-8. THE 6-MINUTE TIME WARNING

The jumpmaster follows the same procedures described for the 20-minute time warning. The exception is that he extends and spreads the fingers and thumbs of one hand, and extends the index finger of the other hand as the oral command is given.

4-9. FIRST SEVEN JUMP COMMANDS

The jumpmaster(s) is now ready to issue the first seven jump commands.

a. After the parachutists are standing, safety personnel inspect the following items on each parachutist while moving forward in the aircraft:

(1) Waistband for proper quick release.

(2) Quick-ejector snap on the HPT lowering line for proper attachment.

(3) Activating arm on the weapons container for proper attachment.

b. Safeties must be alert for and correct any excess webbing or loose lowering line. Once they have checked the last parachutist and after the command HOOK UP, they return to the aft end of the aircraft. While moving to the aft end, safeties check the full length of each parachutist's static line to ensure proper routing and attachment to the anchor line cable.

c. After the jumpmaster receives "All okay, jumpmaster," he regains control of his static line from the safety, takes the number one parachutist position, and waits for slow-down procedures.

d. Once the aircrew has completed their slow-down checklist (slow aircraft to drop speed, open jump doors, deploy air deflectors, and position jump platforms), the loadmaster orally transfers control of the jump door by saying, "Your door, Army," and moves to the ramp area. Safety personnel then position themselves near the trail edge of the jump door and control the static line for the jumpmaster as he performs the door safety check and outside air safety check.

4-10. DOOR SAFETY CHECK

The jumpmaster is now ready to perform his door safety check. He transfers control of his static line back to the safety. Then, he grasps the lead edge of the door with his lead hand and the trail edge of the door with his trail hand. He ensures the pip pin is in place, securing the jump door in the open position on the C-130 or that the door-latch catches operate on the C-141 (Figure 4-9).

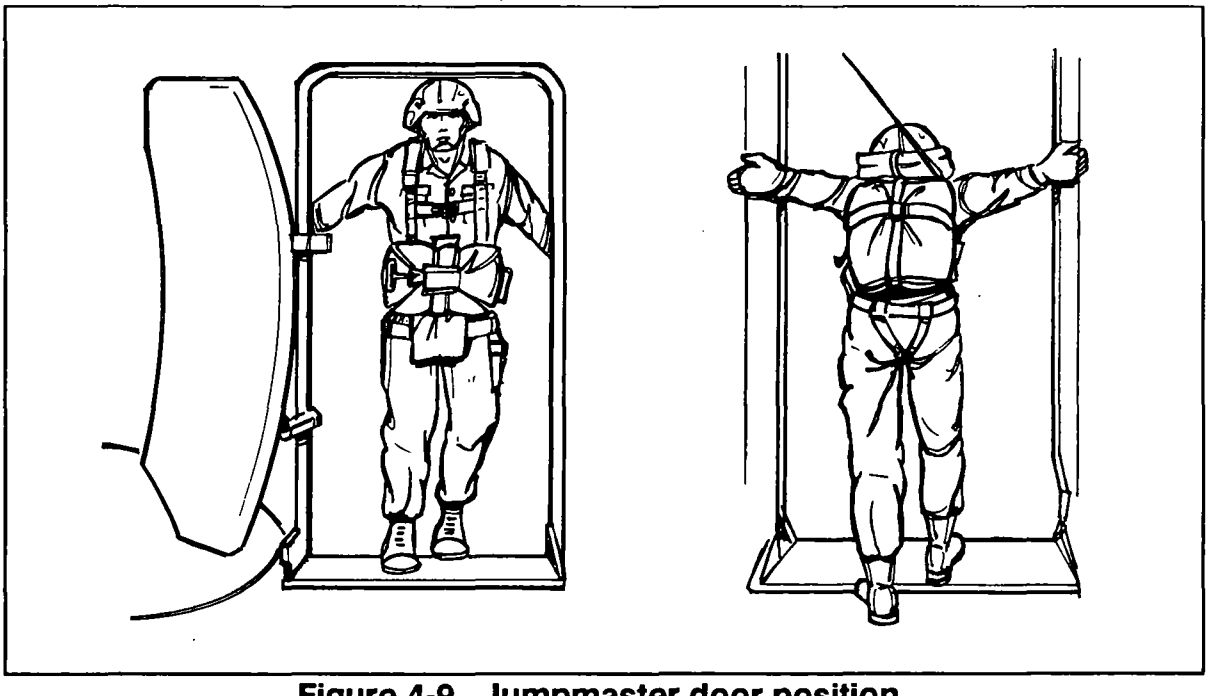


Figure 4-9. Jumpmaster door position.

a. **Jump Platform.** The jumpmaster checks the jump platform by–

(1) Tapping the left down lock with the left foot and visually checking to ensure it is engaged. (He repeats the same procedure with the right side.)

(2) Firmly placing one foot in the center of the jump platform and shifting his weight to the platform, ensuring the platform can support the body weight. His foot remains in place. From this rest position, the jumpmaster performs all remaining duties in the door until it is time to issue the eighth jump command.

b. **Trail Edge of Door.** With the trail hand, the jumpmaster starts at the top of the trail edge of the door, tracing all the way down to the trail down lock, then back to the top to ensure no sharp or protruding edges exist.

c. **Air Deflector.** The jumpmaster looks at the air deflector, ensuring it is fully deployed.

4-11. INITIAL OUTSIDE AIR SAFETY CHECK AND CHECK POINTS

The jumpmaster must make outside air safety checks to ensure there are no unsafe conditions outside the aircraft (aircraft in the formation to the rear that are below drop altitude, other low-flying aircraft). From the same rest position, the jumpmaster leans out and visually checks–

- Direction of flight.
- Overhead.
- Rear.
- Straight down.
- Straight to the front.
- Back in direction of flight.

The jumpmaster continues observing outside the aircraft and spotting for checkpoints en route to the DZ. In the absence of checkpoints, he uses additional time advisories from the air crew, which must have been identified during the pilot/jumpmaster briefing. The navigator and primary loadmaster should also be present for this briefing. The jumpmaster relays checkpoints or time advisories to the parachutists by leaning back inside the aircraft, facing the parachutists, and issuing the checkpoints or time advisories.

4-12. THE 1-MINUTE WARNING

The jumpmaster relays this warning to the parachutists by leaning back, facing the parachutists, and extending only the index finger of his lead hand. He continues observing outside for this 30-second checkpoint or until he receives a 30-second time advisory from the loadmaster.

4-13. FINAL OUTSIDE AIR SAFETY CHECK

After the jumpmaster has called his 30-second checkpoint or relayed a 30-second

time advisory, he performs his final outside air safety check. Once again, he leans out and visually checks –

- Direction of flight.
- Overhead.
- Rear. (Ensures no aircraft in the formation have dropped below jump altitude.)
- Straight down.
- Straight to the front.
- Direction of flight. (The jumpmaster may be able to see the DZ at this time, depending on the aircraft axis of approach. However, he has no responsibility to positively identify the DZ, code letter, or color of smoke.)

a. If the jumpmaster observes any unsafe conditions outside the aircraft, he notifies the loadmaster by a planned arm-and-hand signal that a no-drop situation exists for this pass. Otherwise, he prepares bundles or personnel or both for exit when the green light comes on.

b. The jumpmaster makes his final check and determines when the aircraft is about 20 seconds out from the release point, based on his checkpoint or USAF advisory. Then he moves back inside and positions the first door bundle on the jump platform so that it is on its balance point. Then the jumpmaster(s) –

(1) Maintains a firm grasp on the bundle with the lead hand and a firm grasp on the trail edge of the jump door with the trail hand. He ensures that the cargo parachute static line is routed above the trail arm.

(2) Keeps his eyes on the jump caution light. When the light turns green, he ejects the door bundle(s), ensuring that it goes straight out and does not tumble.

(3) Maintains a firm grasp with his trail hand and turns toward the cargo area. The jumpmaster and assistant jumpmaster make eye-to-eye contact and give each other the thumbs-up signal, indicating that the door bundle has been ejected, that they are not aware of any unsafe conditions, and that they are ready to exit personnel. (Parachutists are not positioned in the door until this is accomplished.) These procedures are followed when ejecting door bundles from one door or both doors, as long as both doors are open.

(4) Moves on line with the lead edge of the jump door and issues the eighth jump command IAW the exit procedures.

c. When door bundles are not used on an airborne operation, the jumpmaster makes his final check to determine when the aircraft is about 10 seconds out from the RP, based on his checkpoint or USAF advisory. Then he—

(1) Maintains a firm grasp on the trail edge of the door with the trail hand and turns toward the cargo area. The jumpmaster and assistant jumpmaster make eye-to-eye contact and give each other the thumbs-up signal, indicating that they are not aware of any unsafe conditions and that they are ready to exit personnel. (Parachutists are not positioned in the door until this is accomplished.) These procedure are followed when exiting personnel from one or both doors, as long as both doors are open.

(2) Moves on line with the lead edge of the jump door and issues the eighth jump command IAW the exit procedures.

4-14. EIGHTH JUMP COMMAND

The jumpmaster issues the eight jump command STAND IN THE DOOR (C-130) or STAND BY (C-141) IAW the exit procedure being used. After issuing the eight jump command, the jumpmaster immediately regains control of his static line from the safety. He backs away from the door toward the middle of the aircraft to allow the safety room to control static lines. The safety receives the first parachutist's static line with the lead hand and passes it to the trail hand to control it until the parachutist exits.

4-15. NINTH JUMP COMMAND

When the jumpmaster issues the ninth jump command GO, he ensures that he has backed away from the door and the safety to avoid confusion or congestion. Safety personnel continue taking static lines while the jumpmaster controls the flow of parachutists.

a. **Red Light Procedures.** If a jumpmaster, safety, or parachutist sees a red jump caution light, he sounds off with "Red Light," at which time the jumpmaster/assistant jumpmaster moves forward to block the flow of the stick. If any parachutist tries to exit on the red light, he will be allowed. No one touches or physically tries to stop a parachutist who is past the leading edge of the door. Parachutists will be stopped by oral command only to reduce the risk of accidentally activating his reserve.

b. **Jump Refusals.** When removing a jump refusal out of the door, the jumpmaster tells the refusal GO three times. If he does not, he tells the refusal "You are a jump refusal and I am taking you out of the door." Then, the jumpmaster should approach the parachutist from the rear and grasp the sides of his parachute. The jumpmaster never puts his hand in front of the parachutist's face or grabs the back of his helmet.

(1) The safety should warn the parachutist that he is being brought back inside the aircraft. Under no circumstances should the safety reach around in front of the parachutist to pull him back into the aircraft, which could accidentally hit or grab the ripcord grip.

(2) After the jump refusal is brought back inside the aircraft, he is guided back to a position high on the ramp, away from the jump door. He does not touch his equipment and is kept hooked up until the pass is over. Then, he is moved to the front, out of the way of the static line retriever. Then, the refusal is unhooked, sat down, and buckled up.

c. **Unsafe Parachutist.** If a parachutist, who has already passed the leading/forward edge of the door, must be stopped because of a misrouted static line or other critical deficiency, he is approached from the back to grab the sides of his parachute pack. The safety never reaches around in front of the parachutist, puts his hands in front of the parachutist's face, or grabs the back of his helmet.

4-16. TOWED PARACHUTIST (FIXED WING)

After all parachutists have exited the aircraft, the jumpmaster and assistant jumpmaster hand off their static lines to the safeties and exit the aircraft.

a. If the jumpmaster or assistant jumpmaster observe a towed parachutist, the following actions are taken by the jumpmaster.

(1) Stop the stick of parachutists (if applicable).

(2) Notify the loadmaster who in turn notifies the pilot and requests that drop altitude be maintained.

(3) Identify how the parachutist is being towed. If being towed by anything other than the lowering line or static line, attempt to free the parachutist. If towed by a lowering line, immediately cut the lowering line thus freeing the parachutist. If the parachutist is being towed by the static line, then initiate recovery procedures.

b. The primary jumpmaster observes the towed parachutist and recommends whether to retrieve or cut the parachutist free. The recommendation is relayed by the loadmaster to the pilot. The pilot makes the decision. Priority is as follows:

(1) *Door.* The assistant jumpmaster and safety personnel move the remainder of the stick toward the front of the aircraft. If the parachutist is to be retrieved, the loadmaster installs the retriever bar on the C-141 or the CGU1-B strap on the C-130, retracts or folds in the jump platform, and initiates retrieval. All personnel stay clear of the door and line of travel of the static line retriever cable. When the parachutist has been retrieved

to the door, the jumpmaster and safety personnel gain physical control of the parachutist. The loadmaster relieves tension from the static line retriever so that the parachutist can be brought inside the aircraft. The retrieved parachutist is moved all the way forward and is seated. He does not jump again. If the retrieval is unsuccessful and the parachutist must be cut free, the loadmaster cuts the static line.

(2) *Ramp*. If a parachutist is towed following a ramp exit and is to be cut free, the loadmaster partly retrieves the static lines to reach the towed parachutist's static line in order to cut it. If the parachutist is to be retrieved, the loadmaster installs a CGU1-B strap (C-130) about 5 1/2 feet above the ramp. The static lines are retrieved over the CGU1-B strap. As the parachutist is retrieved to the ramp area, the jumpmaster and safety personnel gain physical control of him. The parachutist is pulled into the aircraft (under the strap) as the loadmaster relieves tension from the static line retriever cable. The parachutist is moved all the way forward and is seated, and does not jump again.

c. Occasionally, the above towed parachutist procedures must be modified—for example: MAC combat control (CCT), pararescue (PJ), and special operating weather teams (SOWT). Jumpmasters are responsible for the safety of the parachutists (equipment checks and deployment safety) as long as they are on board the the deployment aircraft. The loadmaster(s) is trained for and is responsible for retrieving hung parachutists. No additional jumpmasters or safeties are required to remain on board the aircraft for CCT, PJ, or SOWT deployments. If all parachutists have exited, those actions described as jumpmaster responsibilities are accomplished by the loadmaster(s). The aircrew is responsible for all equipment left on board the aircraft by the jump unit until it can be retrieved or turned over to the unit concerned.

NOTE: Towed parachutist procedures for rotary-wing aircraft are discussed in Part 3.

d. After all parachutists have exited (including jumpmasters), safety personnel visually clear to the rear of each jump door and give the USAF loadmaster working his side of the aircraft a thumbs up signal and an oral "Your door, Air Force," indicating that all parachutists are free and clear of the aircraft.

e. Safety personnel assist the loadmaster, as requested, in the recovery of static lines and deployment bags. Once inside the aircraft, safety personnel detach the static lines, and store them and deployment bags in the extra aviator's kit bags.

f. While en route back to the departure airfield, safety personnel obtain the name, rank, social security

number, unit, and reason for any parachutist remaining on board. They also check the aircraft for any Army equipment that was left on board for turn in to the DACO.

g. On return to the departure area, safety personnel turn in (and obtain a receipt for) all air items (reserves, deployment bags, and kit bags). They also turn over any Army equipment left on board to the DACO. All jump refusals and personnel left aboard the aircraft are immediately turned over to the DACO with a full account of the circumstances for each.

CHAPTER 5

DEPARTURE AIRFIELD CONTROL OFFICER

The DACO is appointed by the airborne commander and is responsible for coordination and control of the loading of personnel, equipment, and supplies into USAF aircraft. The DACO is located at the departure airfield.

5-1. INITIAL COORDINATION

When advised of appointment, the DACO is furnished the following information:

a. The unit(s) that is jumping.

b. Type of jump and number of personnel.

c. Type and number of aircraft.

d. Number of lifts.

e. Load time.

f. Station time.

g. Weather decision time.

h. Drop zone.

i. Names of DZSO, assistant DZSO, jumpmaster, and safety personnel.

5-2. ALCE COORDINATION

At the departure airfield, the DACO makes contact with the ALCE to discuss and coordinate the following:

a. Aircraft parking plan.

b. Aircraft tail number.

c. Weather data.

d. Flight line safety measures.

e. Appointment of a ground liaison officer.

f. Current safety regulations (ALCE advises DACO).

g. Aircraft loading (how and when).

h. Return of parachutists refusing to jump (how they are to be managed).

i. Provide ALCE with one copy of the manifest.

j. Ensure ALCE that aircraft are inspected upon return for air items and other Army equipment that may have been left onboard.

5-3. DZSO/DZST COORDINATION

The DACO –

a. Contacts the DZSO/DZST one hour before drop time.

b. Informs the DZSO/DZST of aircraft aborts.

c. Updates the DZSO/DZST on changes.

d. Requests a flash report from the DZSO/DZST.

e. Requests timely wind readings from the DZSO/DZST.

5-4. ADDITIONAL COORDINATION

The DACO–

a. Maintains radio and telephone contact with ALCE and higher headquarters.

b. Controls movement of all vehicles.

c. Coordinates for lighting for night operations.

d. Ensures all units police their area.

e. Reports all serious incidents.

f. Is present for all weather briefings and decisions.

g. Ensures parachute maintenance personnel are present for issue and technical assistance.

h. Is familiar with regulations and the SOP of the unit involved in the operation.

5-5. AIRFIELD AND RUNWAY SAFETY

The DACO –

a. Is responsible for the movement in and around aircraft, taxiways, and runways.

b. Briefs all jumpmasters and safety personnel on airfield procedures.

PART TWO

EQUIPMENT

CHAPTER 6

INDIVIDUAL COMBAT JUMP LOADS

Individual equipment and weapons are attached or worn by the parachutist in several configurations—for example, exposed, placed inside containers, or a mix of the two. Airborne SOPs specify ways of packing equipment and other mission-essential items consistent with safety requirements and this manual.

Section I. LOAD PLACEMENT

Fragile items (like weapon sights) are padded. Crushable items are not placed directly under the H-harness. Exposed weapons or equipment, snap hooks, and projections on containers are potential safety hazards and are taped.

6-1. LOAD DISTRIBUTION

Individual equipment attached to the equipment belt is placed on the front or sides of the body away from the landing fall points of contact. The combat pack, medium or large ALICE, is attached to the front of the parachutist using an H-harness and HSPR. A lowering line is attached if the pack exceeds 35 pounds or has a frame attached. Hard, bulky, or irregularly shaped items are not placed to the rear of the parachutist or on the thighs.

6-2. CONSIDERATIONS

Commanders are cautioned not to overload parachutists with equipment. The variety and weight of equipment and weapons that can be attached to a

parachutist may exceed a safe descent rate. Also, the parachutist's actions (and time available) to release tie-down straps and lower equipment may interfere with control of the parachute close to the ground (Figures 6-1 and 6-2).

TWO EQUIPMENT LOADS AND BASIC LOAD (POUNDS)

SOLDIER LOAD TYPE	LOAD-BEARING EQUIPMENT WITH TWO CANTEENS (WATER)	ALICE PACK WITH SLEEPING BAG (WINTER)	BATTLE DRESS UNIFORM, HELMET, AND BOOTS (1)	M1950 WEAPONS CONTAINER	WEAPONS LOAD WITH AM-MUNITION (2)	SUSPENDED WEIGHT OF T-10C/MC1-1C PARACHUTE AND RESERVE	SOLDIER WEIGHT	TOTAL SUSPENDED WEIGHT (POUNDS) (3)
M16 RIFLEMAN	11.5	32	15	7.3	31.0	23	205	324.8
M60 MACHINE GUNNER	11.5	32	15	7.3	54.4	23	205	348.0
M203 GUNNER	11.5	32	15	7.3	40.0	23	205	343.8
DRAGON GUNNER	11.5	32	15	6.5 (WEAPONS ONLY)	55.9	23	205	348.9
RADIO OPERATOR	11.5	32	15	7.3	71.6	23	205	355.4

(1) Weight of uniform does not include winter gear (for example, parka, liners, underwear).
(2) Includes basic load of ammunition, grenades, claymore, bayonet, and cleaning kit.
(3) Does not include arctic gear.

Figure 6-1. Weight of parachutist.

DESCRIPTION	WEIGHT (POUNDS)	REFERENCE	REMARKS
MAXIMUM LOAD-BEARING CAPACITY, T-10C/MC1-1B/C MAIN CANOPY.	500	NATICK RESEARCH AND DEVELOPMENT COMMAND.	
MAXIMUM LOAD-BEARING CAPACITY TO ACHIEVE 22 FEET PER SECOND OR LESS DESCENT RATE, T-10C/MC1-B/C MAIN CANOPY.	360	NATICK RESEARCH AND DEVELOPMENT.	TOTAL SUSPENDED WEIGHT.
AIRMOVEMENT PLANNING WEIGHT OF COMBAT-EQUIPPED PARACHUTIST.	250		PARACHUTIST WITH ONE EQUIPMENT CONTAINER.

Figure 6-2. Parachute load limit.

Section II. LIFE PRESERVERS

6-3. B-7 LIFE PRESERVERS

The B-7 is worn under the parachute harness. To fit the life preserver, place one flotation packet under each arm so that the packet flaps are to the outside, and the toggle cords are down and to the front. Run the shoulder strap from front to rear over the left shoulder, under the backstrap, then from rear to front over the right shoulder, and attach it to the ring on the right flotation packet. Adjust the shoulder strap so that the flotation packets fit snugly against the armpits. Attach the chest strap to the attachment rings on the left flotation packet, forming a quick release.

WARNING: ENSURE THAT THE B-7 LIFE PRESERVER IS WORN SO THAT THE INFLATABLE PORTION IS NOT BETWEEN THE PARACHUTE HARNESS AND THE BODY. SERIOUS INJURY MAY RESULT IF IT IS IN THIS POSITION WHEN INFLATED.

6-4. B-5 LIFE PRESERVERS

The B-5 is worn under the parachute harness. The flotation vest is placed over the neck so that the inflatable vest is on the parachutist's chest. The backstrap and leg straps are adjusted. It is inflated by pulling two toggle cords at the bottom of the vest. An alternate provision for inflating the vest is by blowing into rubber hoses located on the upper-right side of the vest. Manual inflation valves should be completely closed when donning the life vest. Manual inflation should be used only if the CO2 inflation valves fail to operate.

WARNING: DO NOT INFLATE THE B-5 LIFE PRESERVER UNTIL THE PARACHUTE HARNESS IS REMOVED. THE B-5 CAN CRUSH AN INDIVIDUAL'S CHEST IF INFLATED BENEATH A PARACHUTE HARNESS.

Section III. H-HARNESS AND LOWERING LINE

All load carriers (ALICE packs and weapons cases) are attached to the parachutist by H-harnesses and if lowered, rigged with the lowering line.

6-5. H-HARNESS

Two types of harnesses are used--the older H-harness (modified); and the new standard A, harness single-point, release (HSPR) assembly. (The HSPR replaces the modified H-harness through attrition.)

a. The H-harness (modified) (Figure 6-3) consists of two nylon straps (each 84 inches long). These are connected by two 11-inch spreader bars. Each long strap has two friction adapters (3

inches apart). Two 24-inch, D-ring attaching straps modified with 6-inch white extensions with snap hooks are part of the assembley.

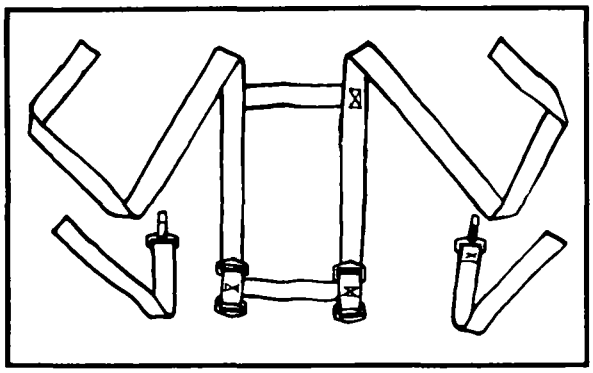
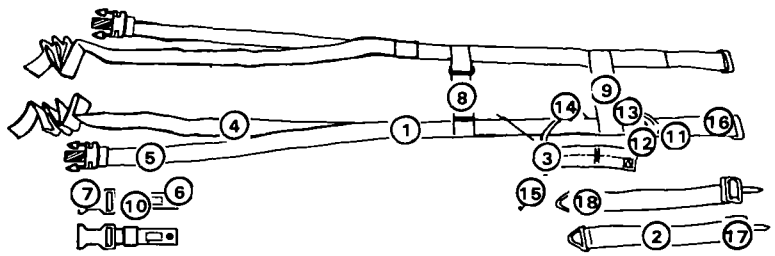


Figure 6-3. H-harness.

b. The H-harness is used to rig the combat packs (ALICE) to the parachute harness. When rigging the H-harness, the parachutist ensures that equipment fits snugly under there serve parachute and that the D-ring attaching strap snap hooks are spaced four fingers distance from the H-harness friction adapters.

6-6. HARNESS, SINGLE-POINT RELEASE ASSEMBLY

The HSPR is an H-type design and is made of nylon webbing with quick-fit adapters to secure it around the load. To stabilize the pack to the parachutist during movement in the aircraft, exit, and main parachute deployment / development, two adjustable leg straps are provided to secure the pack to the parachutist's right and left legs. The leg straps are equipped with plastic Fastex releases. The harness has a single-point release assembly that simultaneously releases the load and leg straps from the parachutist and parachute harness (Figure 6-4).



1. HARNESS, SINGLE-POINT RELEASE
2. ATTACHING HARNESS STRAP
3. RELEASE HANDLE ASSEMBLY
4. EQUIPMENT RETAINER STRAP
5. LEG STRAP
6. ADJUSTABLE LEG STRAP
7. CABLE LOOP RETAINER
8. ADJUSTABLE CROSS STRAP
9. CROSS STRAP/RELEASE HANDLE ATTACHMENT
10. ELASTIC KEEPER
11. ATTACHING LOOP "A"
12. ATTACHING LOOP "B"
13. ATTACHING LOOP "C"
14. HANDLE RETAINER LANYARD
15. RELEASE HANDLE CABLE
16. QUICK-FIT ADAPTER
17. SNAP HOOK
18. TRIANGLE LINK

Figure 6-4. Harness, single-point release (NSN 1670-01-227-7992).

6-7. HOOK-PILE TAPE LOWERING LINE ASSEMBLY

The HPT lowering line (Figure 6-5) is used to lower all equipment attached to the parachutist. The HPT has been modified to accommodate the Dragon missile jump pack (DMJP) and AT4 missile jump pack when lowered as a tandem load.

a. The lowering line (standard) (15 feet in length) is made of tubular nylon (1 inch wide) with a (9 inch by 7 inch) nylon duck retainer (stow pocket) sewn to the upper end. The stow pocket flaps have HPT sewn to the edges.

b. Two-inch tabs are sewn on the lowering line and, when the line is stowed, the tabs are secured to prevent line spillage. The metal (parachute harness) quick-ejector snap has a (1 inch by 8 inches) yellow nylon lanyard attached.

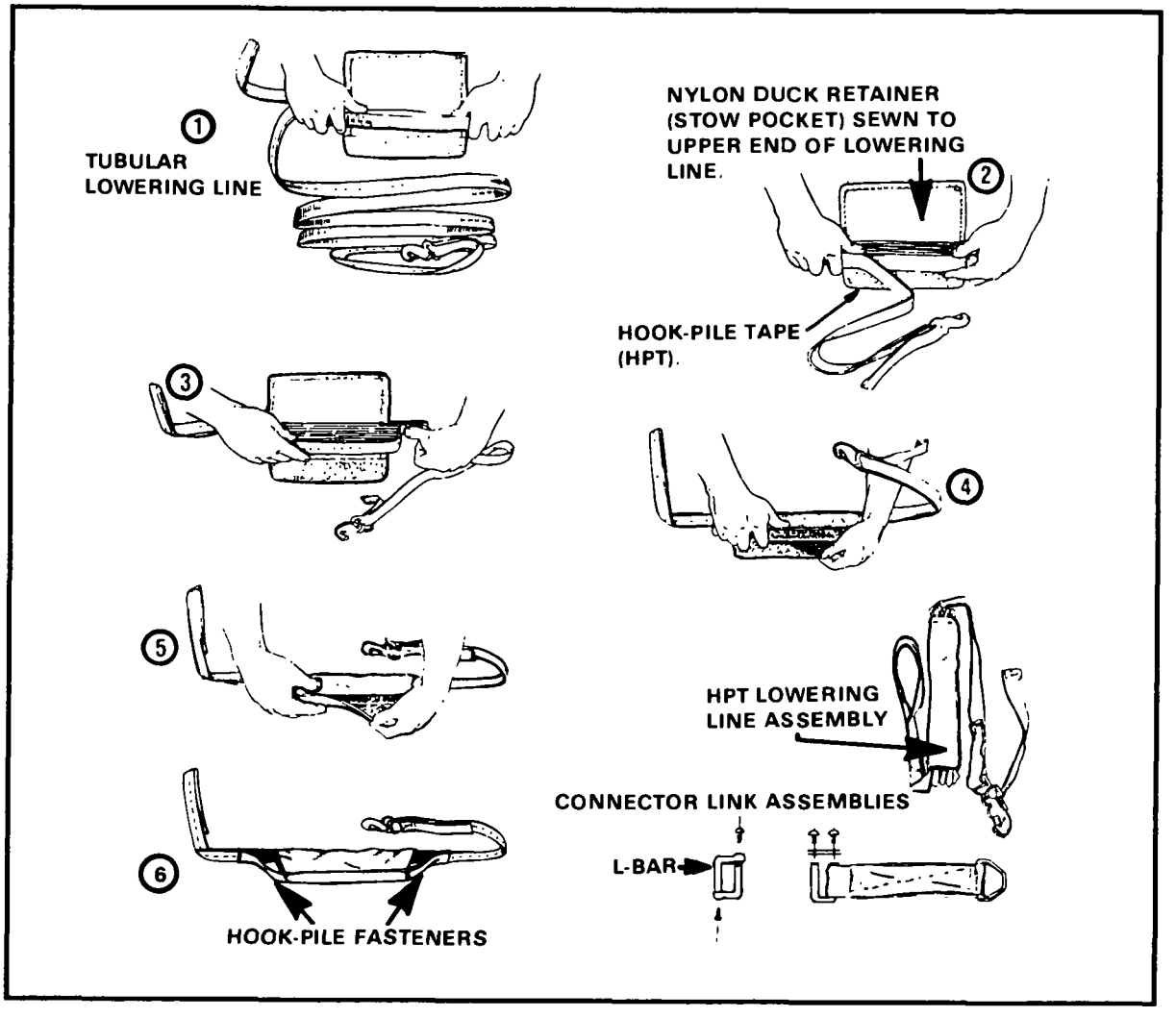


Figure 6-5. HPT lowering line assembly.

6-8. HOOK-PILE TAPE LOWERING LINE (MODIFIED)

The HPT lowering line assembly (modified) (NSN 1670-01-067-6838) must be used when the DMJP and AT4 are lowered as a tandem load. The modification is accomplished in the field as described below.

a. Materials Required.

(1) Fastener tape, pile, color OG106, 1 inch wide, Class 1 MIL-F-21840, NSN 8315-00-106-5974.

(2) Thread, nylon, color OD-S1, Type II, Class A, size E, V-T-295, 2,500-yard tube, NSN 8310-00-244-0609.

(3) Ink, marking, parachute, color strata blue, Type IV of MIL-I-6903, NSN 7510-00-286-5362.

b. Stitching Requirements.

(1) Stitching will conform to FED-STD-751, type 301, 7 to 9 stitches per inch.

(2) Ends of stitching will be overstitched not less than 1/2 inch.

c. Modification Procedure (Figure 6-6).

(1) Carefully cut the stitching that secures the 2-inch long HPT located about 11 3/4 inches from the quick-ejector snap end and remove cut stitching.

(2) Cut a 2-inch length of HPT. (If the previously removed HPT is undamaged, it may be used in lieu of replacement tape).

(3) Place marks 46 and 48 inches from the folded web edge quick-ejector snap end on the same side of the removed 2-inch HPT of the 1-inch side lowering line.

(4) With pile side facing up, position 2-inch HPT between the markings, and stitch with a single box stitch formation.

d. Markings (Figure 6-6).

(1) Stencil the following with 1/2-inch high characters on the outside of retainer fabric using a stencil brushand parachute-marking blue ink"DMJP/AT4JP MOD."

(2) Stencil a 1/8-inch wide line across the web width on each side of the lowering line, 18 inches from the fold web edge quick-ejector snap end.

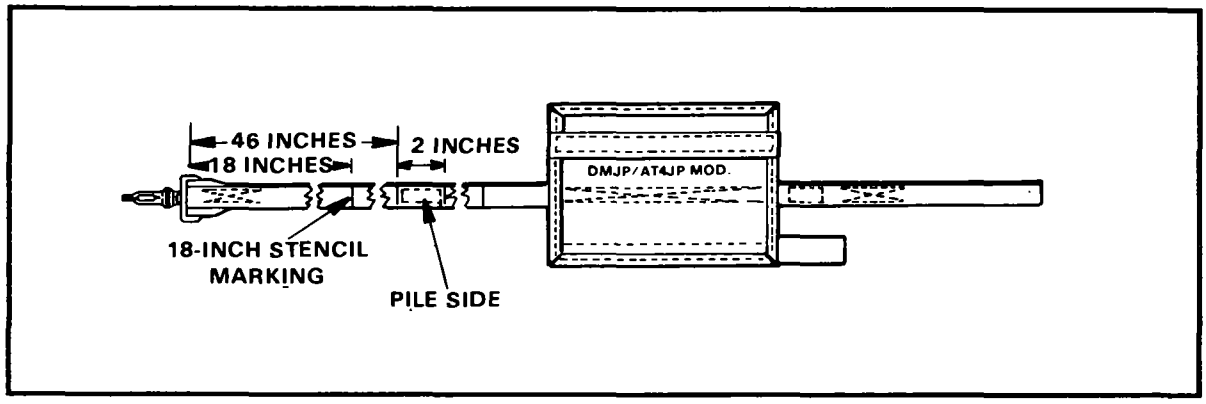


Figure 6-6. Method for attaching HPT and stencil markings.

(see chg 1, 25 Jan 91)

6-9. LOWERING LINE ADAPTER WEB

The lowering line adapter web is attached to the left main lift web or the parachute harness and is the attaching point for the HPT lowering line. The adapter web is attached by removing the screws from the separate link assembly and removing the assembly from the web. The free end of the web is threaded through the left D-ring of the parachute harness, and between the bar and main lift web. The link assembly is reattached through the loop on the free end of the adapter web and around the main lift web, and the screws are securely reset (Figure 6-7). When attaching equipment to be lowered, the web must be removed from under the waistband and routed over (to the outside) the waistband.

NOTE: The lowering line adapter web will become obsolete when the T-10 modified parachute harness with triangle links is received by units.

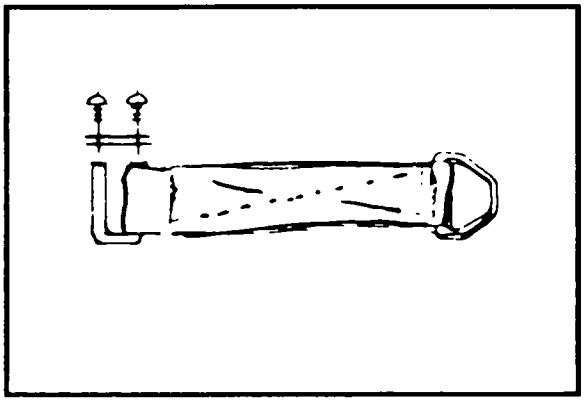


Figure 6-7. Lowering line adapter web.

Section IV. ALICE PACKS AND LOAD-BEARING EQUIPMENT

6-10. ALICE COMBAT PACKS (MEDIUM AND LARGE)

ALICE medium and large combat packs are attached to the parachutist using the H-harness or the harness, single-point release assembly (HSPR). They can be lowered (during descent) by attaching the HPT lowering line.

a. Items of equipment are inserted, and padding is placed between the load and the front portion of the pack. The outside pockets are filled with nonfragile items (full pockets help position the H-harness on the pack). The pack is closed by engaging the drawstrings and tie-down straps. The shoulder straps are adjusted snugly. The excess webbing on the shoulder straps is S-folded and taped. The running ends of the waist straps are routed around the frame opposite the lower back pad, tightened, and secured in place by taping. This secures the straps and reduces the possibility of entanglement on board the aircraft.

b. If carried, the sleeping mat is rolled tightly to reduce its size. The mat is placed between the two top vertical tie-down straps and the top cover of the pack, and secured by tightening the straps. The H-harness or HSPR encompasses the mat when it is routed around the combat pack.

6-11. ALICE PACKS RIGGED WITH FRAME, H-HARNESS, AND HPT LOWERING LINE

a. Rigging the Pack.

(1) Turn the pack upside down. Place the modified H-harness on the pack so that the spreader bars are in front of the pack and the friction adapters are touching (or near) the bottom of the pack frame.

(2) Run the harness straps over the top of the pack load outside the shoulder carrying loop strap and then under the top portion of the frame.

(3) Then, run the harness straps over the horizontal bar of the frame and cross them at the center of the back of the pack.

(4) Run the straps under the frame and secure them to the friction adapters, forming a quick release.

(5) Thread the (H-harness) D-ring attaching straps through the intermediate friction adapters, forming a quick release with the running ends pointing away from the parachutist.

b. Attaching Lowering Line While Rigging Pack.

(1) Girth hitch the lowering line loop (at the rear center of the pack from top to bottom) around the X formed by the crossed H-harness straps. This ensures that the loop end of the lowering line does not slide up or down the H-harness.

(2) Stow the lowering line in its container pocket and secure it to the left side (as worn) of the pack frame with two retainer bands.

NOTE: Items may be attached to the outside of the ALICE pack in accordance with individual unit SOPs, providing they are secured by point of attachment (clips) and further secured with 1/4-inch cotton webbing (two turns) or nylon parachute cord (canteens, entrenching tools).

c. Attaching the ALICE Pack.

(1) Attach the snap hooks of the D-ring attaching straps to the D-rings on the parachute main lift web outside the reserve parachute connector snaps. Secure the pack in one of two ways:

NOTE: This load must be snug under the reserve parachute.

(a) Route the lower tie-down on the weapons case around the left leg and frame of the pack, and tie it with a bowknot on the front leading edge of the weapons case (when jumping from the right door).

(b) When 1/4-inch cotton webbing is used, it is attached to the ALICE frame on the right side (as worn), secured around the right leg, and tied in a bowknot (when jumping from the left door).

(2) Always route the tie-down around the leg opposite the jump

door and secure it with a bowknot (for example, left leg, right door). (The parachutist must be able to reach the bowknot on the tie-down.)

(3) Attach the HPT lowering line quick-ejector snap to the accessory attaching ring on the lowering line adapter web (Figure 6-8).

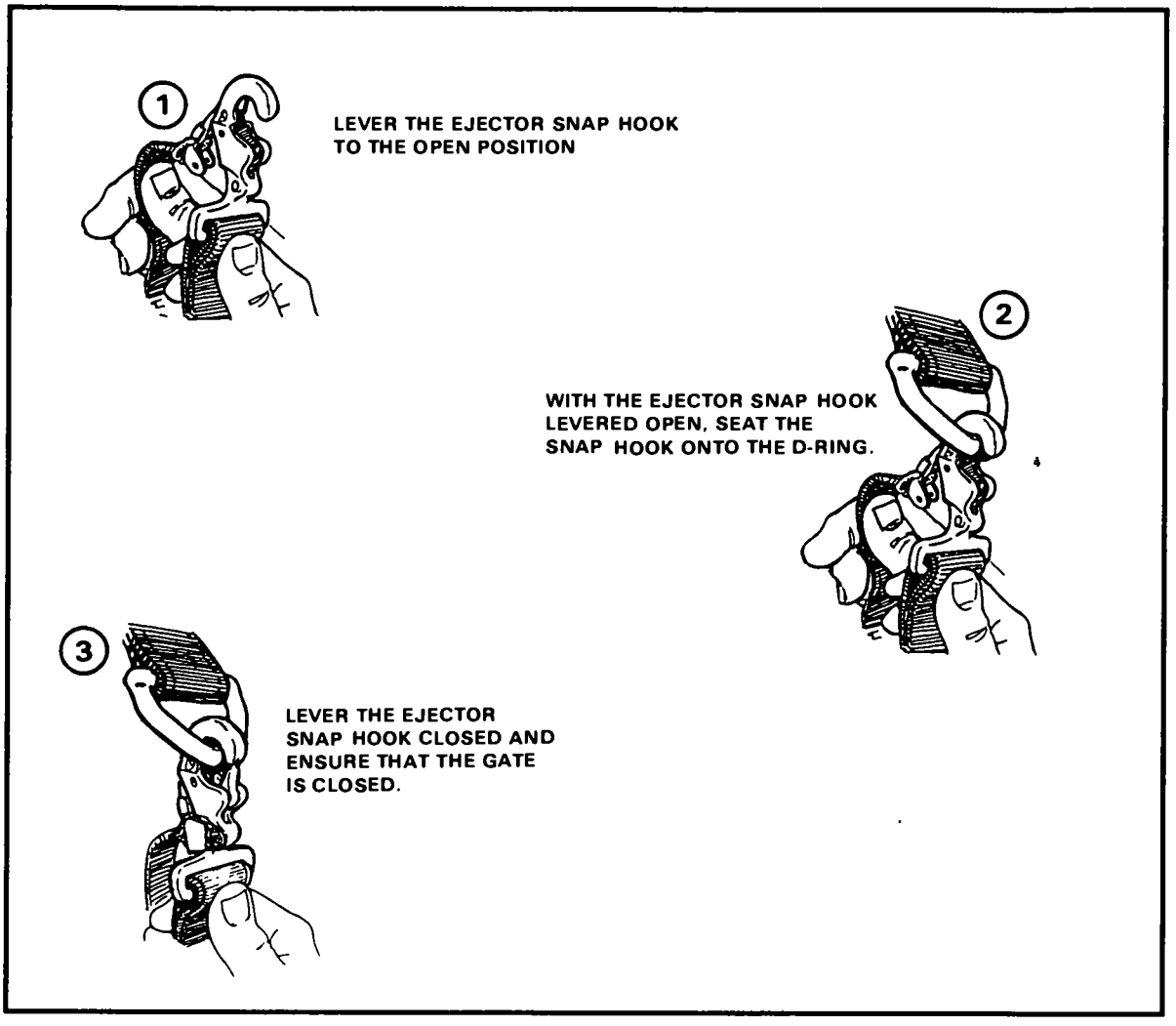

1
LEVER THE EJECTOR SNAP HOOK TO THE OPEN POSITION
2
WITH THE EJECTOR SNAP HOOK LEVERED OPEN, SEAT THE SNAP HOOK ONTO THE D-RING.
3
LEVER THE EJECTOR SNAP HOOK CLOSED AND ENSURE THAT THE GATE IS CLOSED.

Figure 6-8. Quick-ejector snap connected on HPT lowering line to D-ring on the parachute harness.

d. Releasing the Pack.

(1) Upon exiting the aircraft, execute the first two points of performance and, during the third point of performance, release the lower tie-down.

(2) About 200 to 100 feet above the ground, check below for other parachutists and pull both running

ends of the D-ring attaching straps (allowing the ALICE pack to fall the length of the lowering line).

6-12. TANDEM LOAD AND LOWERING LINE

After the pack is rigged to the H-harness and frame, the lowering line is attached to the H-harness and stowed. The lowering line is secured to the left vertical bar of the frame (as worn) with two retainer bands. The ALICE pack and M1950 weapons case (when jumped together) are usually rigged as a tandem load and lowered on the same lowering line. After the pack and weapons case are attached to the parachute harness D-rings, the lowering line quick-ejector snap is passed between the weapons case and the webbing of the case, which is attached to the case V-ring. The lowering line quick-ejector snap is then attached to the attaching ring on the lowering line adapter web (Figure 6-9).

Figure 6-9. Lowering line attached for tandem rigging.

6-13. TANDEM LOADS RELEASED AND LOWERED (H-HARNESS)

Upon exiting the aircraft, the parachutist executes the first two points of performance. Then, during the third point of performance, the upper and lower tie-down tapes on the weapons case are untied. The right leg tie-down on the ALICE pack is released (if jumping the ~~left door~~). About 200 to 100 feet above the ground, the ALICE pack is lowered by pulling (simultaneously) on the free running ends of the D-ring attaching straps, allowing the pack to fall to the end of the line. The activating arm of the quick-release assembly on the weapons case is pulled, and the case slides down the lowering line to rest on top of the (lowered) pack.

NOTE: The D-ring attaching straps are removed from the parachute harness and secured to the H-harness before the parachute is returned to parachute maintenance after a jump exercise.

6-14. ALICE PACK RIGGED WITH FRAME USING HSPR AND HPT LOWERING LINE

Before attaching the harness to the pack, the release handle assembly and attaching harness straps are attached to the harness (Figure 6-10).

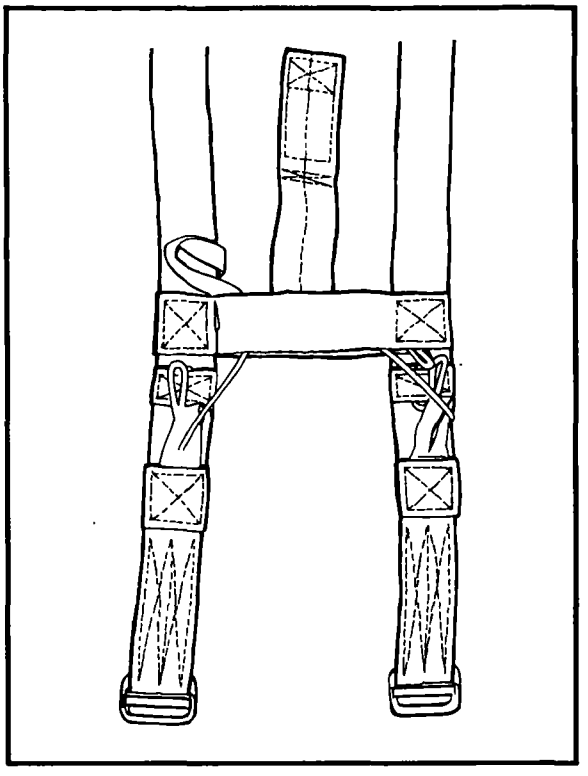


Figure 6-10. Release handle assembly.

a. Route the two release handle cables between the two plies of the cross strap. Attach the pile tape of the release handle assembly to the hook tape attaching tab located between the plies of the cross strap. Ensure that the handle retainer lanyard is not misrouted. Place the triangle links of the attaching harness straps on top of the white attaching loops. Route the white attaching loop up through the triangle link.

b. Route the OD attaching loop up through the white attaching loop. Route the red attaching loop up through the OD attaching loop. Route the red attaching loop through the grommet on the leg strap release

assembly. Ensure that the cable loop retainer on the leg strap release assembly is facing up. Route the release handle cable through the red attaching loop and then through the cable loop retainer.

c. Repeat the process for the other attaching harness strap. Turn the harness over so that the harness attaching straps are on the bottom. Place the ALICE pack on top of the harness so that the middle outer cargo pocket is placed between the cross strap and the adjustable cross strap. Ensure the top of the pack is facing the free running ends of the harness. Route the free running ends of the harness underneath the top of the frame, cross them on the back of the pack to form an X, then route them underneath the frame and the backrest of the pack (Figure 6-11).

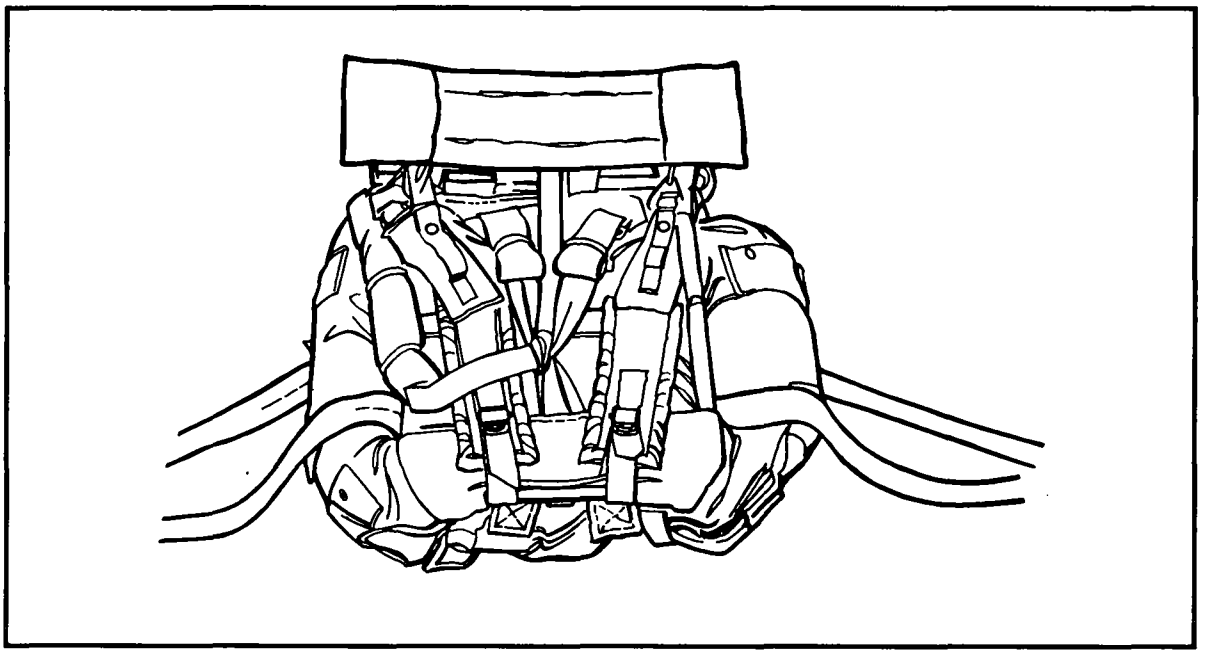


Figure 6-11. Harness routed.

d. Route the free running ends of the harness through their appropriate quick-fit adapters and form a two-finger or three-finger quick release. Roll the excess webbing and secure it with retainer bands. Do not secure the excess webbing to the quick release. Route the leg straps under the top of the frame in the same manner as the harness straps. (If the parachutist is less than 5 feet 9 inches tall, route the leg straps under the tubular portion of the frame above the center cross member. If the parachutist is above 5 feet 9 inches tall, route the leg straps under the tubular portion of the frame below the center cross member.) Ensure the leg straps are fully extended with no twists and attach the leg strap release

assembly using the buckle's side release. Attach the HPT lowering line the same as with the standard H-harness (Figure 6-12).

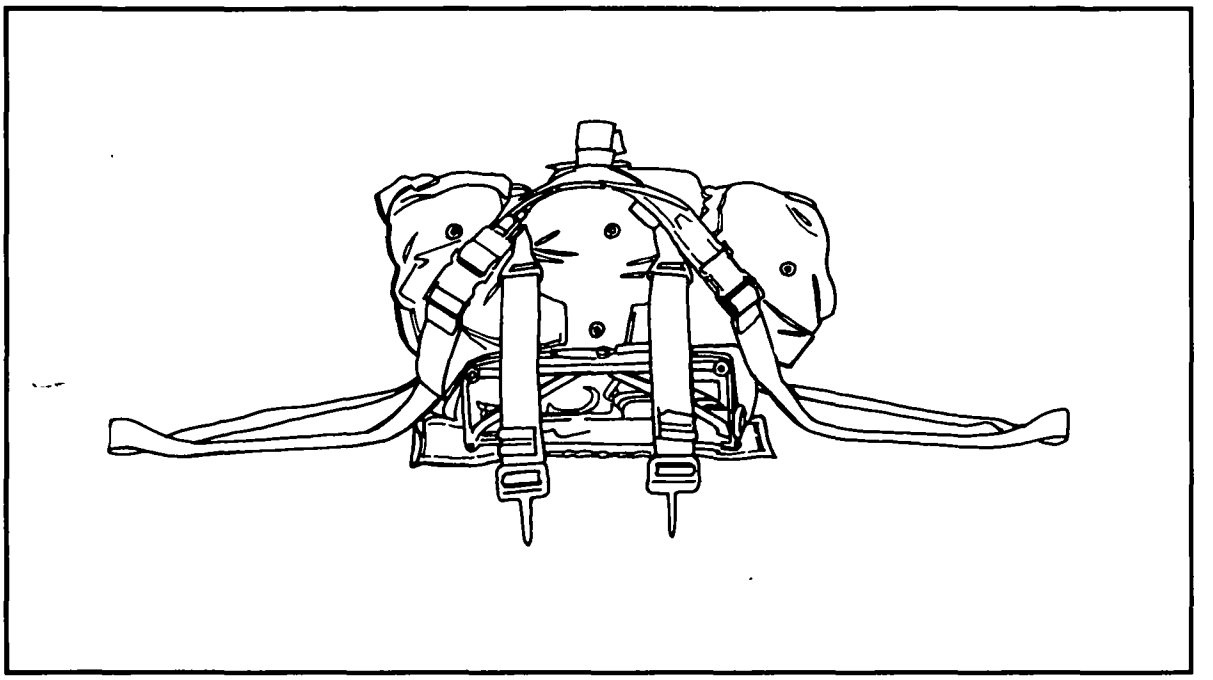


Figure 6-12. Leg straps routed

6-15. HARNESS SINGLE-POINT RELEASE AND ALICE PACK ATTACHED TO PARACHUTIST

When completely rigged, the HSPR is attached to the parachutist in the following sequence.

a. The parachutist stands in front of the harness single-point release rigged ALICE pack. He grasps the harness by the two attaching harness straps and secures them to the D-rings on the main lift webb outside of the connector snaps of the T-10 reserve (Figure 6-13).

b. He pulls on the free running ends of the attaching harness straps and snugs the pack under the reserve. He then routes the quick-ejector snap of the HPT lowering line to the lowering line adapter webb or attaches it as the outermost item on the left D-ring.

c. After the jumpmaster completes his inspection of the harness single-point release during his JMPI, he routes the adjustable leg straps around the parachutists legs and attaches the straps to the leg strap release assembly. If the parachutist is jumping an M1950 weapons case, the jumpmaster routes the left adjustable leg strap around the parachutist's leg

and the M1950. He secures it to the leg strap release assembly. The lower tie-down for the M1950 is removed or tied off on the weapons case.

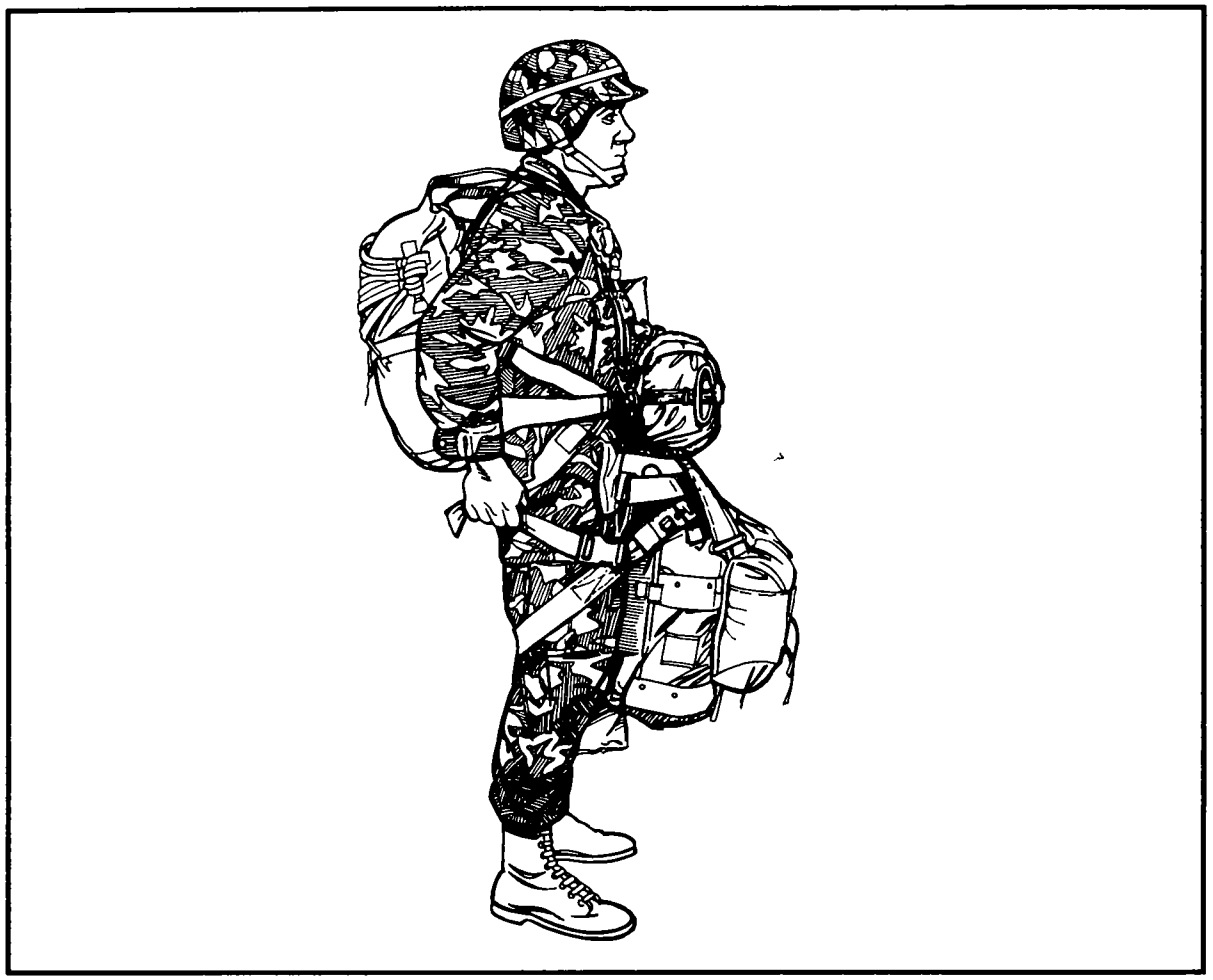


Figure 6-13. Parachutist adjusts leg straps.

6-16. TANDEM LOAD ATTACHED TO PARACHUTIST

The attachment of the rigged pack to the parachutist is identical to the previously described steps with the following exceptions (Figure 6-14).

a. The lower tie-down tape is removed from the weapons case. If using the modified weapons case (with the HPT leg tie-down strap), the tie-down is routed around the case, the HPT is pressed together, and excess webbing is secured.

b. After the weapons case is attached to the parachutist, the leg strap of the HSPR is routed around the outside of the weapons case, and then tightened.

c. The long end of the upper tie-down tape on the weapons case is routed around the case and main lift web,

directly above the chest strap of the parachute harness. It is tied with a bowknot on the front leading edge of the weapons case.

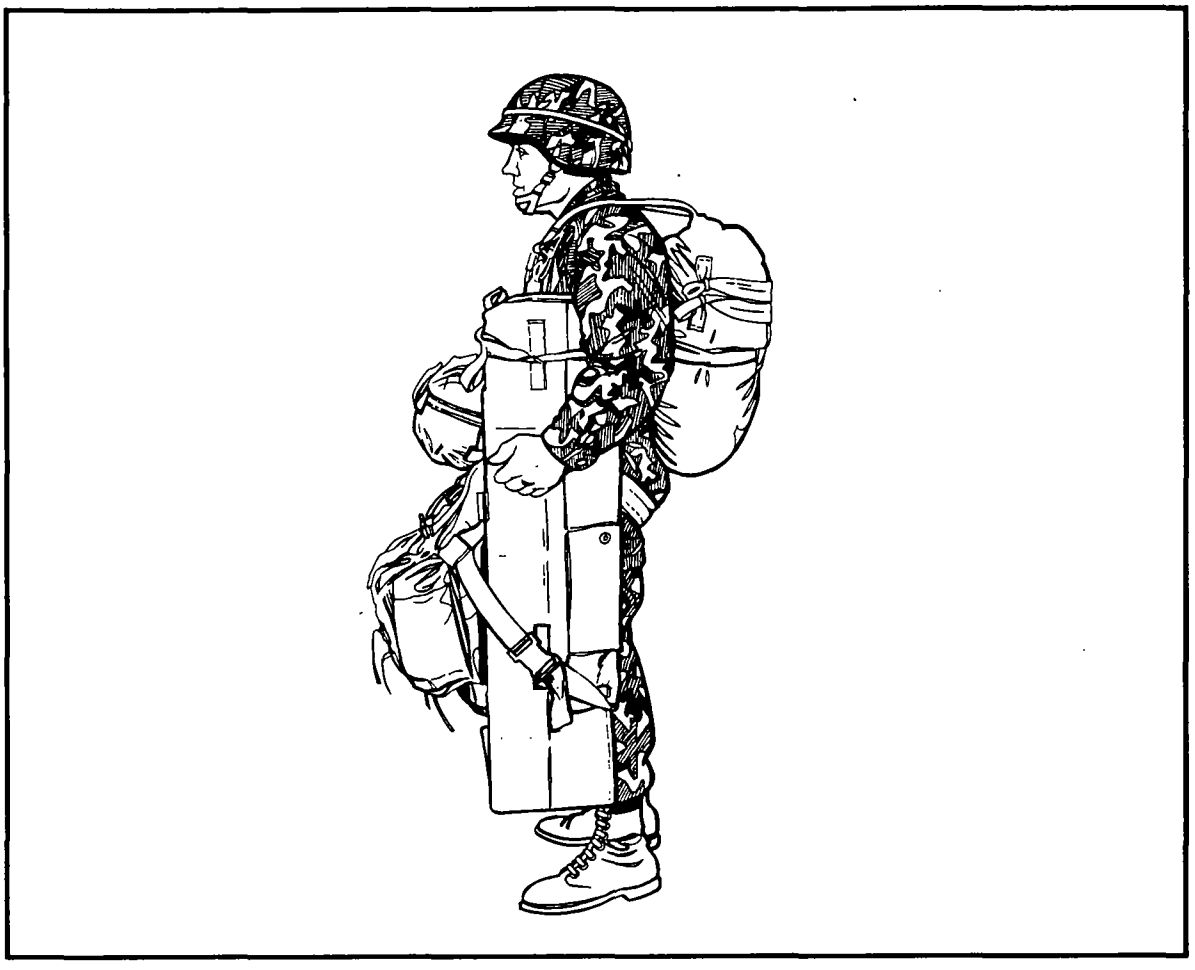


Figure 6-14. Tandem load attached.

6-17. TANDEM LOADS RELEASED AND LOWERED (HSPR)

Upon exiting the aircraft, the parachutist executes the first two points of performance and then, during the third point of performance, the upper tie-down tape on the weapons case is untied.

a. About 200 to 100 feet above the ground, the parachutist grasps the release handle assembly and pulls up and out quickly, simultaneously releasing the load (and leg straps) and allowing it to drop the length of the lowering line. The activating arm of the quick-release assembly on the weapons case is pulled, and the case slides down the lowering line to rest on top of the (lowered) pack.

b. The handle is released immediately following separation of the load

from the parachute. The handle for releasing the load is secured to the HSPR with a length of tubular webbing and stays with the HSPR to prevent its loss or separation.

c. To jettison the HSPR in an emergency, the parachutist lowers the pack, then pulls out on the yellow safety lanyard (attached to the quick-ejector snap), which allows the pack to fall free.

6-18. JUMPING OF EXPOSED LOAD-BEARING EQUIPMENT

The protective mask carrier should be worn reversed so that the lower adjusting strap goes around the outside of the carrier (Figure 6-15). do not place masking tape on the mask carrier.

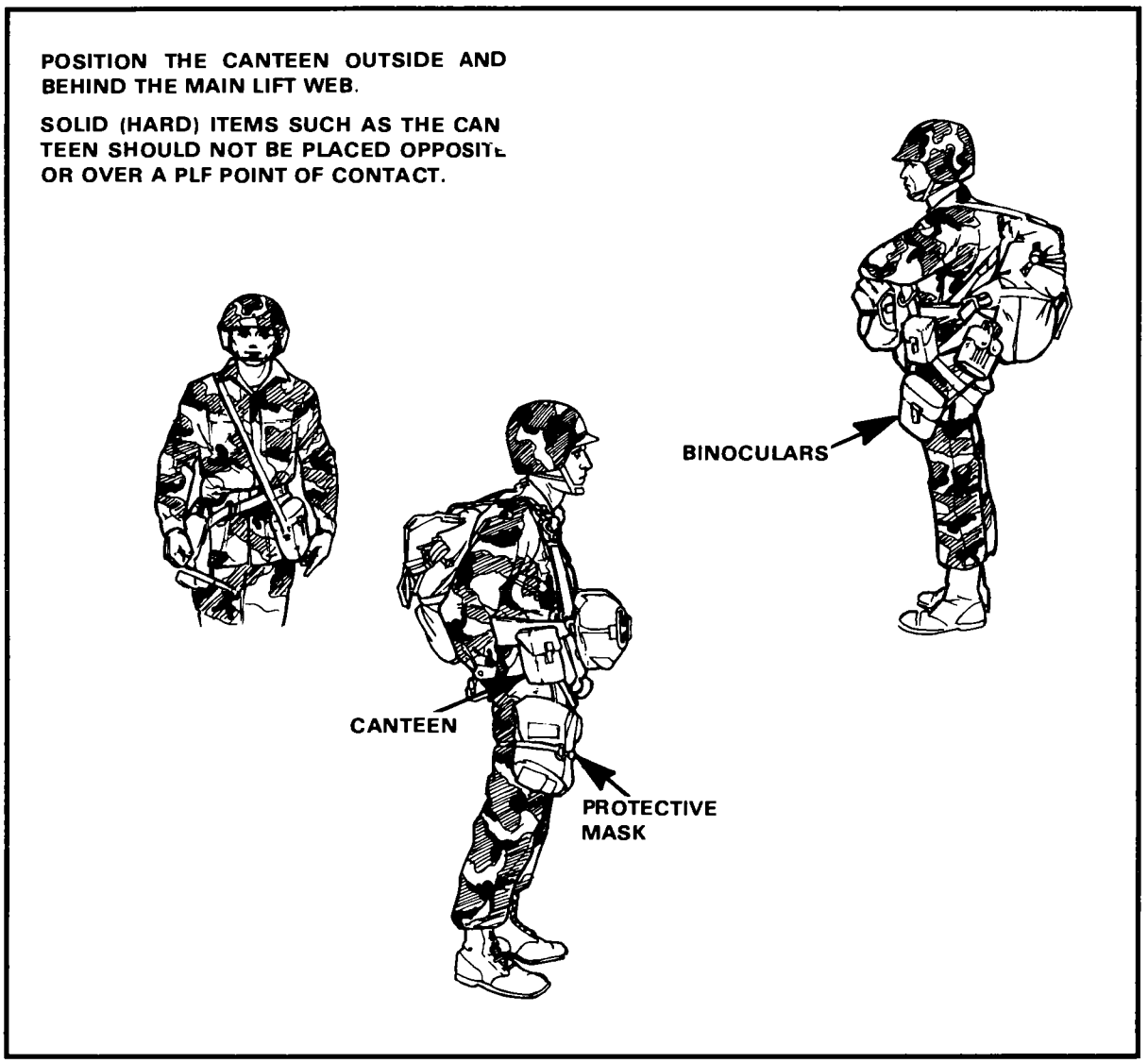

POSITION THE CANTEEN OUTSIDE AND BEHIND THE MAIN LIFT WEB.
SOLID (HARD) ITEMS SUCH AS THE CAN TEEN SHOULD NOT BE PLACED OPPOSITE OR OVER A PLF POINT OF CONTACT.
BINOCULARS
CANTEEN
PROTECTIVE MASK

Figure 6-15. Binoculars and protective mask rigged.

Section V. ADJUSTABLE INDIVIDUAL WEAPONS CASE (M1950)

The parachutist's adjustable individual weapons case is designed to carry individual or crew-served weapons. The case has been modified for other configurations. It is 10 inches wide and is adjustable in length from 33 1/2 inches to 50 1/2 inches. It is secured vertically by a quick-release snap attached to the left D-ring on the parachute harness.

6-19. USE

To prevent the case from swaying during the opening shock of the parachute, two tie-downs fasten the case to the parachute.

a. The upper tie-down is tied around the main lift web of the harness and the lower tie-down goes around the parachutist's leg. If the weapons case has been modified, the lower tie-down strap (HPT) is secured around the leg.

b. Upon landing, the parachutist can scure his weapon quickly by opening the slide fastener (zipper), which is protected by a closing flap.

c. The slide fastener (zipper) is designed as a quick release. To activate it, when the case is closed, a sharp tug on the slide fastener tab thong (in the same direction as when zipping the container close) causes the zipper to come apart.

6-20. WEAPONS CASE ATTACHED TO PARACHUTIST

The case is attached after the parachutist dons (and adjusts) the main and reserve parachutes.

a. The quick-release snap is attached to the quick—release link on the case. The snap opening faces the parachutist and is attached to the parachutist's left D-ring (to the outside of the reserve parachute connector snap).

b. The long end of the lower tie-down tape is passed around the outside of the case and in back of the left leg above the knee. Using a bowknot, the ends of this tape are tied together on the front leading edge of the weapons case. (The knot is untied before landing.) If the case has been modified with HPT leg straps, the piles are pressed together.

c. The long end of the upper tie-down tape is passed (from left to right) around the case and main lift web of the parachute harness above the chest strap. Using a bowknot, the ends of this tape are tied together on the front leading edge of the weapons case.

Section VI. M16 RIFLE/M203 GRENADE LAUNCHER, EXPOSED AND PACKED

The M16 rifle/M203 grenade launcher can be jumped exposed or inside the M1950 weapons case. If the field-expedient method (weapon exposed) is used, the commander must consider that this may increase risk of injury to the parachutists and, therefore, hinder success of the mission. Inherent hazards of the exposed weapon include—

- **The weapon becoming entangled with the parachute of another parachutist if midair collision occurs.**
- **Possible injury to the parachutist during the parachute landing fall.**
- **Damage to the weapon upon landing or being dragged on the ground that may cause a failure to fire.**

6-21. M16A1 RIFLE EXPOSED

The sling is extended all the way, and the keeper is taped in place. The padding is secured over the side-mounted bolt forward assist and charging handle.

a. Pad and tape the muzzle and sight to avoid dirt clogging the weapon upon landing or possible entanglement with the suspension lines of the parachute. Insert and tape the magazine to the receiver, including the ejector port cover, to prevent loss of the magazine and debris from entering the bolt area. (Ensure that a round is not chambered and the weapon is placed on SAFE). Tape the handguards to prevent loss upon impact when landing. To aid the parachutist in the removal of the padding and tape, fold and press the adhesive side on the running end of the tape together to form a quick-release pull tab.

b. Further secure the weapon with two tie-downs of 1/4-inch cotton webbing (or a like item) with bowknots (Figure 6-16). Secure the sling to the diagonal backstrap with the upper tie-down, which is a 12-inch tie strap. Secure the barrel of the rifle to the leg with a 24-inch strap to prevent possible entanglement with suspension lines. Remove the lower tie-down before landing to avoid personal injury.

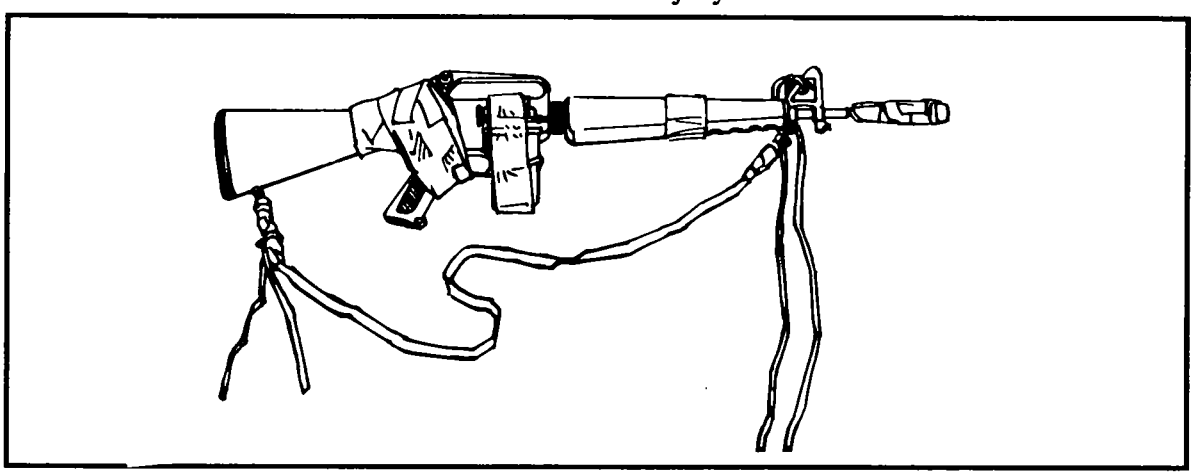


Figure 6-16. Tie-downs.

c. Sling the weapon over the left shoulder with the muzzle down and rotate so that the pistol grip is facing to the (parachutist's) rear (Figure 6-17). Place the sling from the lower keeper (stock) on the outside of the stock and over the left shoulder. Then run it under the chest strap of the main lift web. Thread the waistband through the carrying handle and into the metal adapter on the waistband adjuster panel. Tighten the waistband securely so the weapon lies snugly against the parachutist's side.

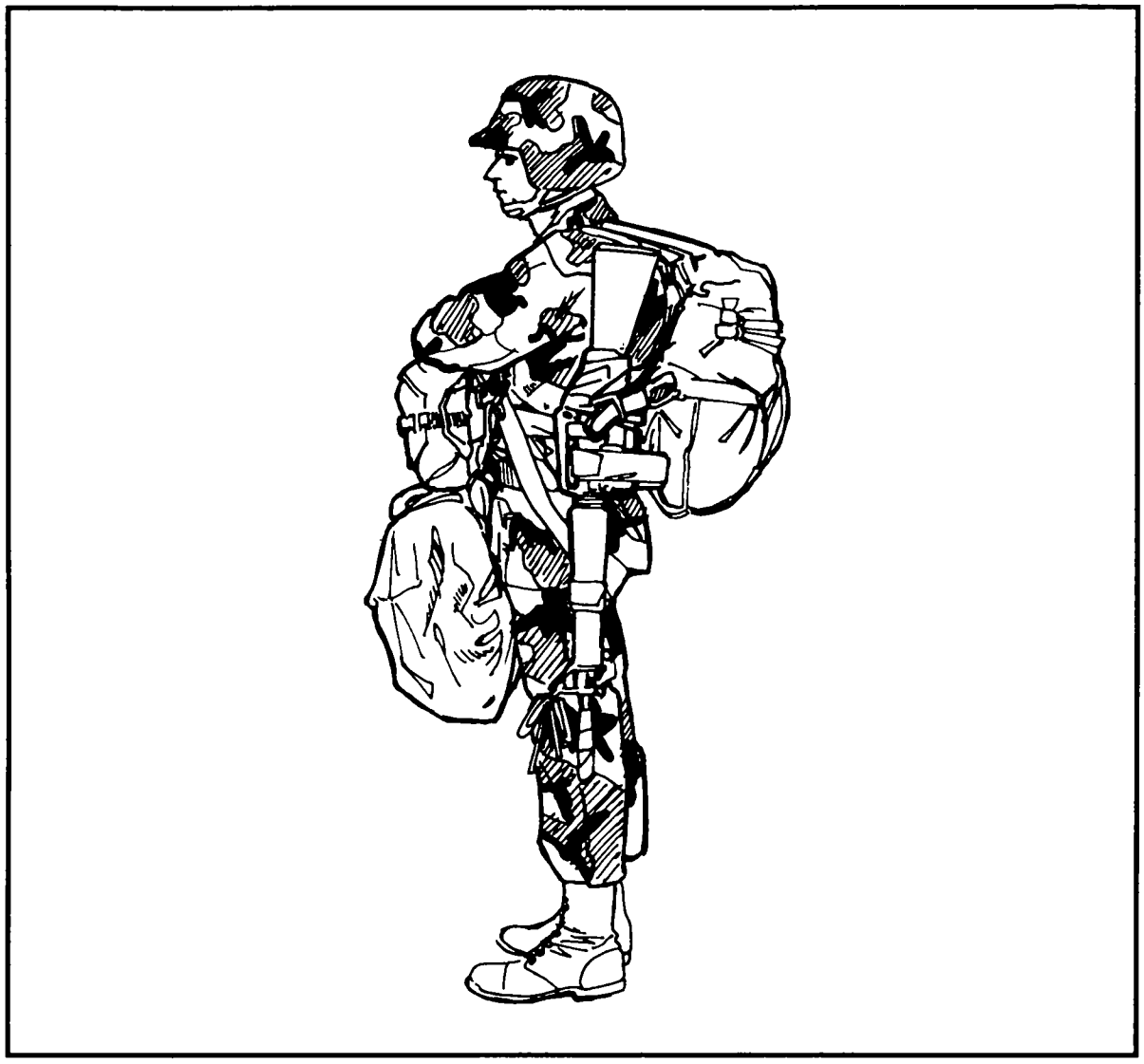


Figure 6-17. Rifle positioning, muzzle down.

d. Prepare the rifle as previously outlined with additional padding and tape around the M203 grenade launcher (Figure 6-18).

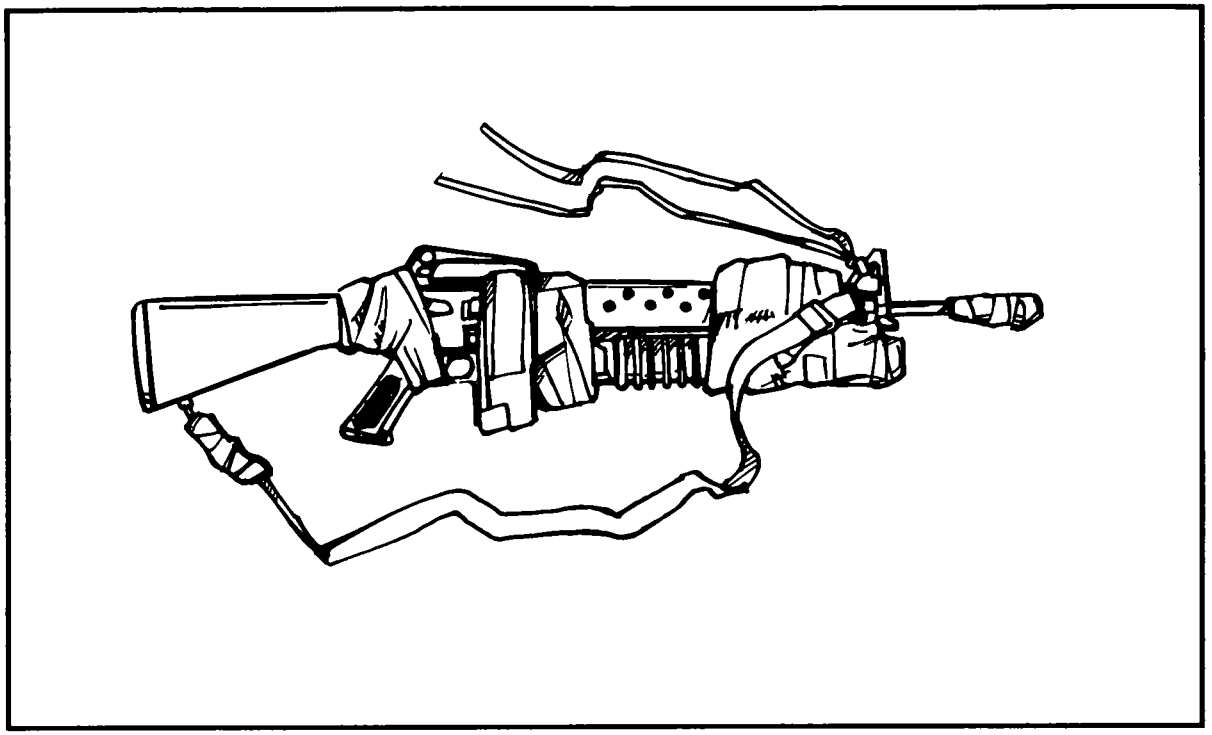


Figure 6-18. Launcher, padded and taped.

6-22. M16A1 WEAPON PACKED IN M1950 WEAPONS CASE

The M1950 case is laid flat with the closing flap facing up and opened. The weapon is inserted muzzle end first into the case with the forward assist facing up. A 20-round magazine is placed in the magazine well, if desired. However, the parachutist ensures that a round is not chambered.

a. Close the case by using the slide fastener assist, slide fastener tab thong, and slide fastener. Leaving the slide fastener 1 to 2 inches from the top, separate the slide fastener tab thong over the lift-the-dot post, and secure the lift-the-dot snap to the lift-the-dot post. If the lift-the-dot snap (or post) is unserviceable, then route the upper tie-down through the slide fastener tab thong.

b. Stand the case on its end so the weapon's muzzle is pointed up. Fold the excess over the back side of the case and route the adjusting strap through the top set of adjusting strap connectors and secure it with a half hitch.

c. The M16A1 may be jumped inside the case with a LAW or starlight scope. When this is done, place the LAW or starlight scope on top of the M16A1, and place padding (cellulose wadding) between the two items. (It is usually rigged to the parachutist as a tandem load to be lowered on a single lowering line with the ALICE pack) (see paragraph 6-12).

Section VII. M60 MACHINE GUN

The M60 machine gun can be rigged on the individual parachutist or dropped as an accompanying load. If jumped on the individual, it is jumped as a team load.

6-23. ASSEMBLED

The case is laid down with the closing flap facing up. The muzzle of the M60 is placed into the lower-right corner of the weapons case. The weapon is pressed down until it is seated inside the case with the operating bolt up.

6-24. DISASSEMBLED

The case is shortened to 36 inches and laid down with the closing flap facing up (required when characteristics of a particular aircraft dictate length restrictions). It is packed as follows:

a. Disassemble the two groups by removing the barrel group.

b. Place the receiver group in the weapons case with the forearm assembly to the right and the cover facing down.

c. Place the barrel group in the case with the front sight to the left and pointing down.

d. Fit in the barrel group by sliding it to the right as far as possible so that the bipod-leg feet are not opposite the trigger housing group.

e. Add padding between the two groups.

NOTE: Team load: The accessory bag, spare barrel, and tripod are placed in a separate weapons case and jumped by the assistant gunner. Both are usually tandem rigged and lowered (see paragraph 6-12).

Section VIII. M249 SQUAD AUTOMATIC WEAPON

The SAW can be rigged for lowering as a tandem rig or single rig. Tandem rigging is the same as the M1950 weapons case and ALICE pack.

6-25. SAW WEAPONS CASE

The M1950 modified weapons case is used for the SAW. The case is marked

"SAW MOD" on the outside, and has an extended 6 1/2-inch flap, which allows the weapon to fit in the case. A piece of cellulose wadding, about 20 inches long and 10 inches wide, is folded and used to form a pad about 10 inches long and 5 inches wide. This pad is placed in the muzzle end of the case. A 30-round magazine may be jumped with the SAW. The magazine is taped to the left side of the buttstock. The SAW is placed inside the case muzzle first, the pistol grip is toward the inside, and the carrying handle is facing up and away from the parachutist's body.

6-26. ATTACHMENT

When rigging the SAW as a single item to be lowered (Figure 6-19), attach the quick-release snap to the quick-release link. This ensures that the opening gate, quick-release snap is facing away from the main body of the SAW MOD M1950 weapons case when the quick-release link is pointed toward the top of the case. Do NOT route the quick-release link through the metal V-ring. No safety tie is used.

a. Prepare the HPT lowering line by folding it in its normal manner: lowering line ejector snap and looped end, and HPT lowering line protruding from opposite ends of the retainer flap. No more than 1/4 inch of S-folds may protrude from the ends of the retainer flap. Secure each end of HPT retainer flap with the HPT tab.

b. Route the looped end, HPT lowering line from top to bottom through the metal V-ring of the SAW MOD M1950 weapons case. Route the entire HPT lowering line through the looped end, HPT lowering line, forming a tight girth hitch around the metal V-ring.

c. Place the HPT lowering line against the main body of the SAW MOD M1950 weapons case to the left of the Type VIII reinforced cotton webbing, which secures the metal V-ring and quick-release link. The lowering line ejector snap points toward the top of the SAW MOD M1950 weapons case. The 1-inch tubular nylon webbing, which forms the looped end HPT lowering line, should rest between the retainer flap of the HPT lowering line and the Type VIII reinforced cotton webbing.

d. Secure the HPT lowering line by a total of four turns of 1-inch wide masking tape--two turns are routed around the main body directly below the quick-release link, and two turns are routed around the main body directly above the upper set of the adjusting strap connections.

e. To attach the SAW MOD M1950 weapons case to the jumper's parachute harness, attach the snap fastener quick-release snap to the left D-ring of the parachute harness as the outermost item of equipment. Route the lowering line ejector snap below the quick-release snap and attach it to the metal V-ring of the lowering line

adapter web, opening the gate facing toward the parachutist. Secure the upper tie-down tape and lower tie-down strape.

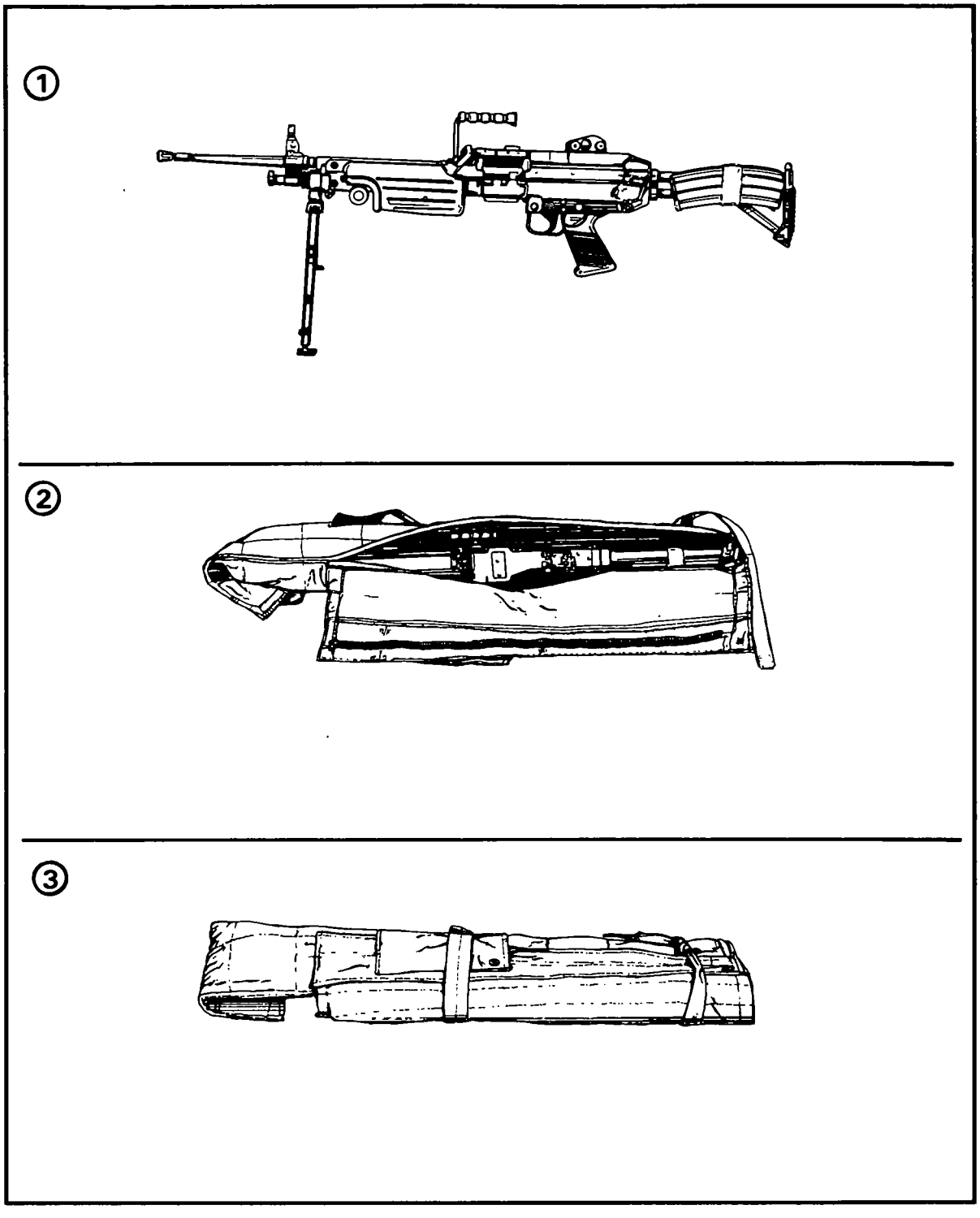


Figure 6-19. SAW rigged as a single item to be lowered.

The M1950 modifie weapons case is used for the 60-mm mortar. It is marked "60-mm MOD" on the outside and has an extended 11 3/4-inch flap.

6-27. MAJOR COMPONENTS

The components of the M224 are as follows (Figure 6-20):

- Aiming posts with case.
- M8 baseplate (small).
- M64 sightunit.
- M225 barrel.
- M170 bipod assembly.
- M7 baseplate (large).

6-28. LOAD DISTRIBUTION

The M224 crew members jump with the following components:

Gunner M224 barrel, M1950 modified weapons case marked 60-mm. M8 baseplate, ALICE pack. M64 sightunit, ALICE pack (centered in ALICE pack).

Assistant gunner M170 bipod assembly, 1950 modified weapons case marked 60-mm MOD.

Ammunition bearer Ammunition, ALICE pack. M7 baseplate, ALICE pack (outside of ALICE pack). Aiming posts with case, ALICE pack (on top).

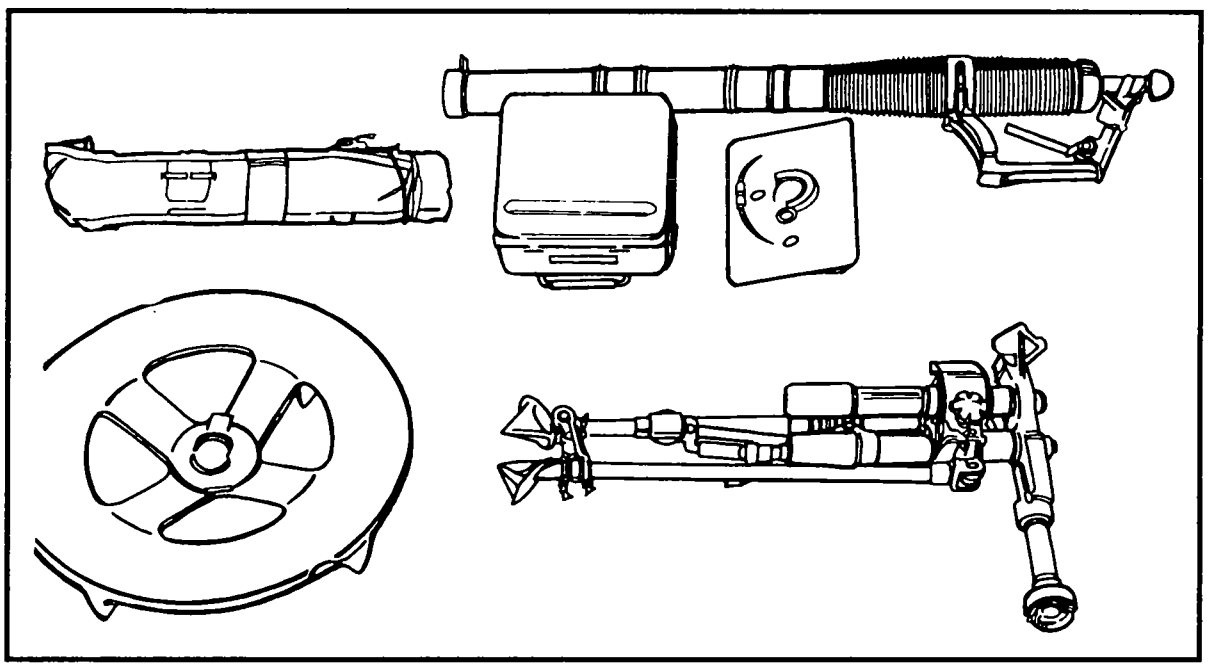


Figure 6-20. Components, M224 mortar.

6-29. INSTRUCTIONS FOR RIGGING

The following are instructions for rigging the M224 60-mm mortar.

a. **Gunner.** Place the barrel inside the case, muzzle down. Pack the small baseplate and sightunit inside the ALICE pack. Pad the sightunit with clothing or cellulose wadding to absorb the impact shock. Tandem-rig the pack and case for lowering (Figure 6-21).

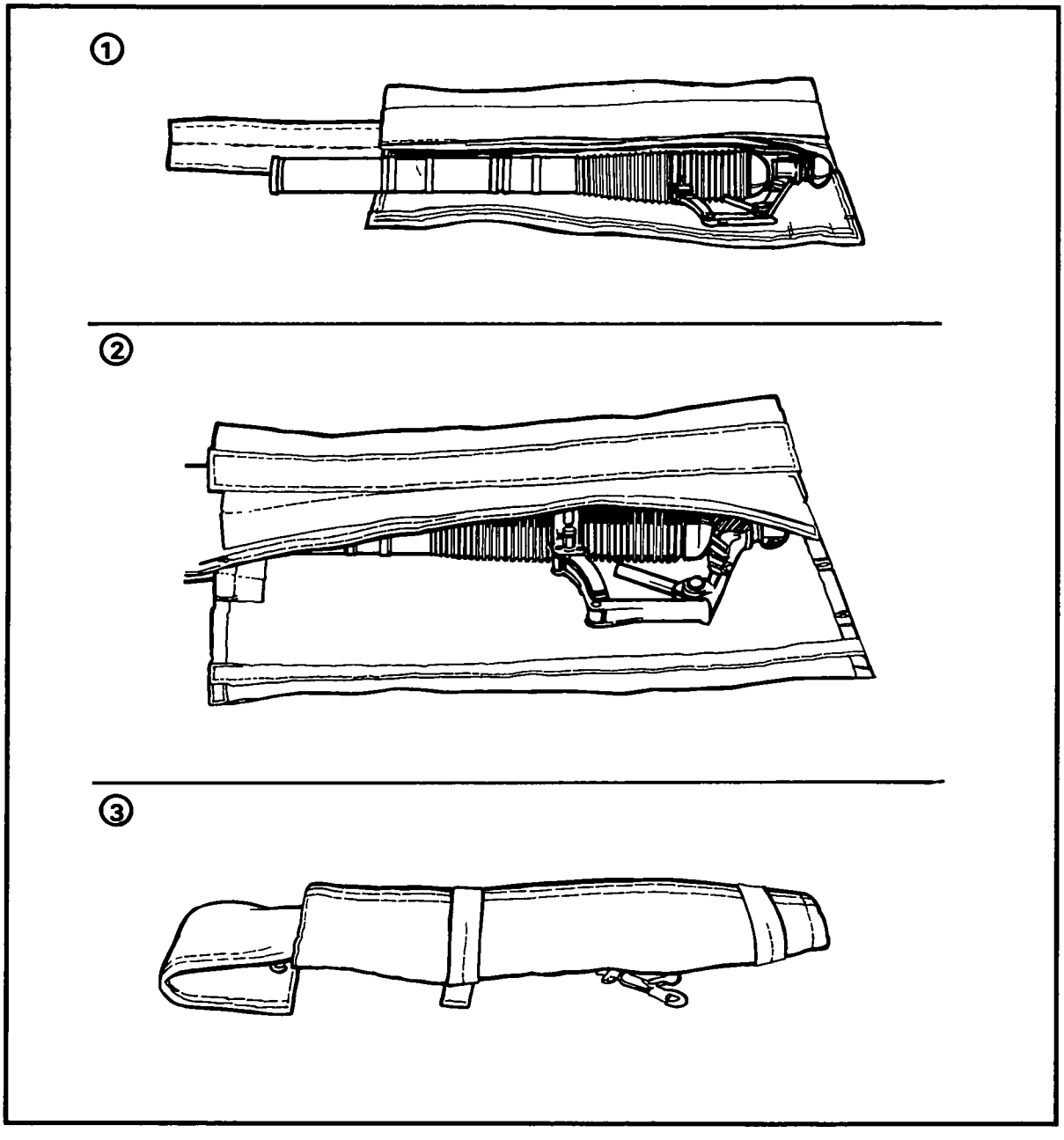


Figure 6-21. Barrel packed.

b. **Assistant Gunner.** Place the bipod assembly inside the case (Figures 6-22 and 6-23), ensuring that the traversing mechanism is in the middle of the case. Secure the closing flap. Tandem-rig the case and pack for lowering (Figure 6-24) (paragraph 6-12).

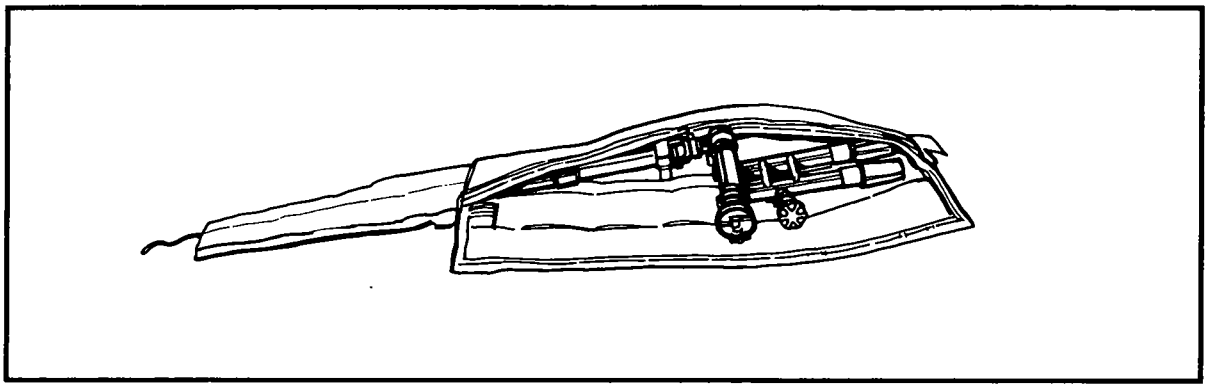


Figure 6-22. Bipod with case.

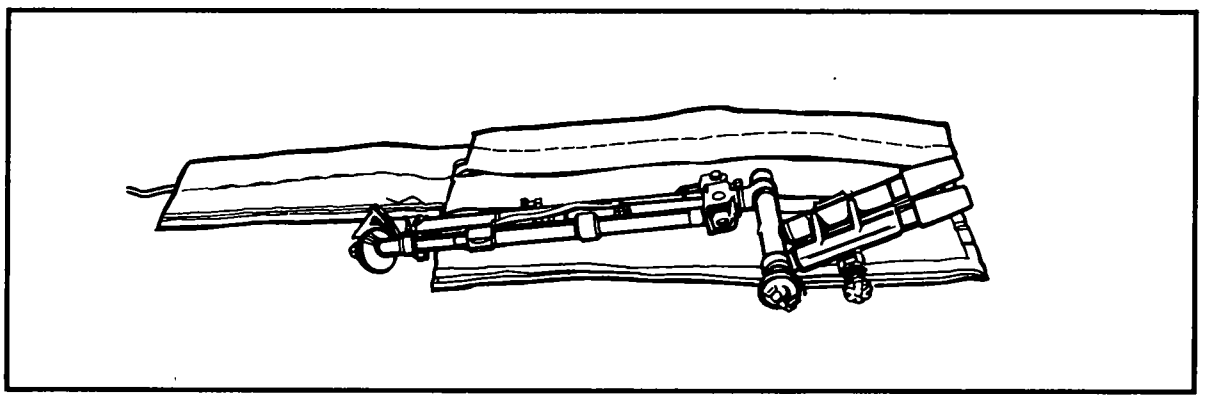


Figure 6-23. Bipod in case.

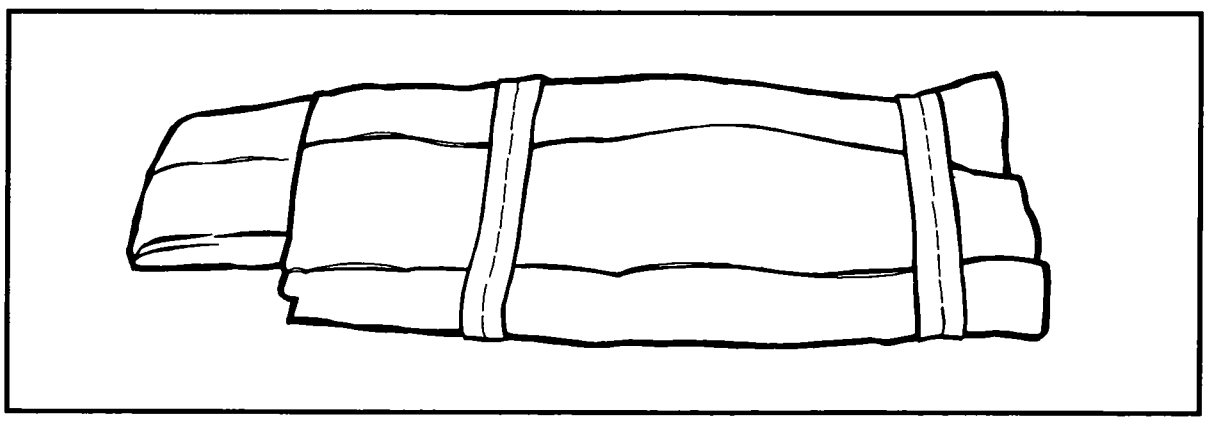


Figure 6-24. Assistant gunner's case completed for jumping.

c. **Ammunition Bearer.** Place the aiming posts under the top flap of the pack and secure with 1/4-inch cotton webbing to the top of the frame (Figure 6-25). Place the large baseplate over the outer accessory pouches and secure to the top of the frame with 1/2-inch tubular nylon webbing (Figure 6-26). Route the free running ends of the pack adjusting straps through the baseplate (over, under, and over) and secure (Figure 6-27). Secure the H-harness to the pack and baseplate, ensuring that the free running ends are routed under the baseplate (top of the ALICE pack) (Figure 6-28) and over the baseplate (bottom of the ALICE pack).

NOTES: 1. Protect ammunition with cellulose wadding or clothing in ALICE pack.

2. Do not exceed weight limitations of the ALICE packs (large, 95 pounds; medium, 70 pounds).

3. Do not exceed weight limitation of parachute (360 pounds rigged weight, T10C/MC1-1B/C).

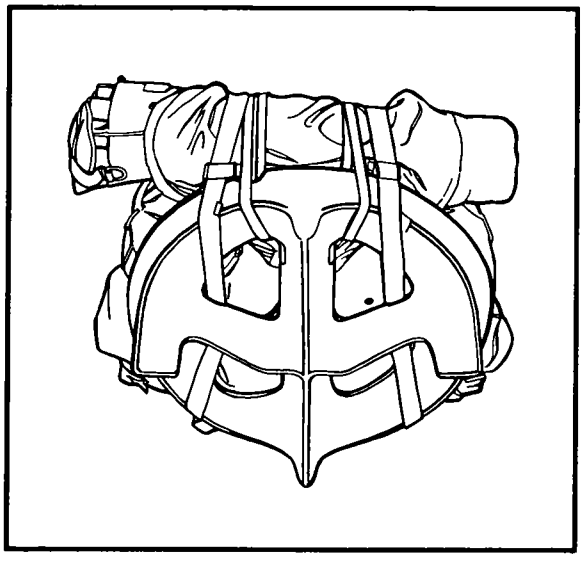


Figure 6-25. Aiming posts packed and secured.

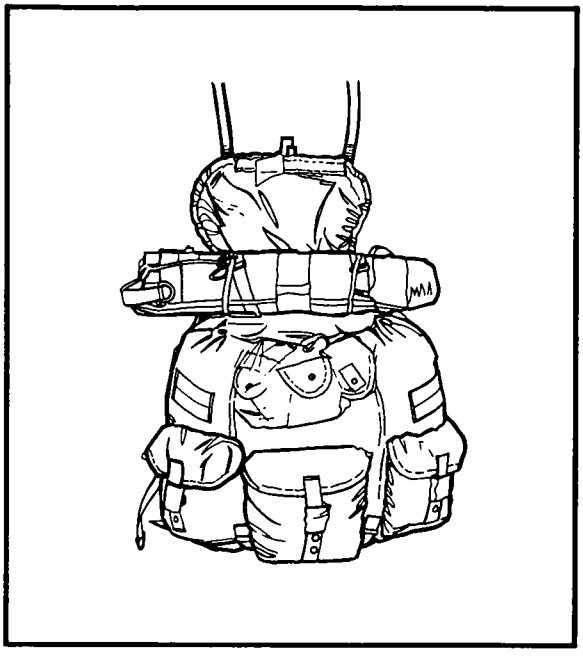


Figure 6-26. Large baseplate secured to frame.

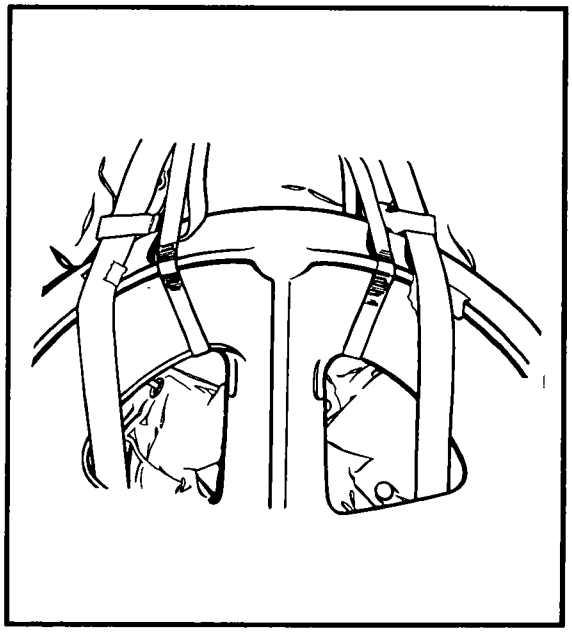


Figure 6-27. Pack adjusting straps routed through baseplate.

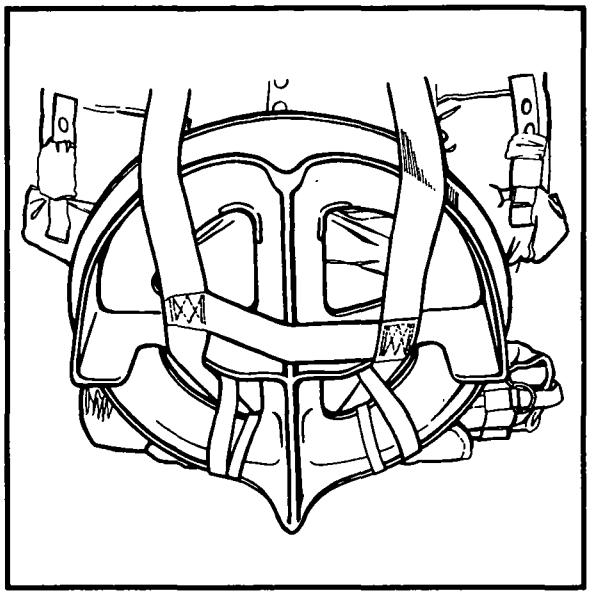


Figure 6-28. H-harness secured to pack and baseplate.

Section X. CONTAINER, WEAPONS AND INDIVIDUAL EQUIPMENT, AND M202A1 ROCKET PACK

The CWIE is a general purpose item used to carry designated combat equipment. It consists of a container and harness assembly, and when rigged for jumping the container is attached to a harness assembly. The maximum dimensions for the CWIE are 12 inches wide, 12 inches deep, and 36 inches long. It can be adjusted to a minimum size of 12 inches wide, 6 inches deep, and 18 inches long. The CWIE weighs 16 1/2 pounds and, when packed, the container and contents must NOT exceed 95 pounds gross weight.

6-30. PREPARATION OF CONTAINER FOR PACKING

The container is laid down with the open portion facing up. A check is made to ensure that all securing straps and quick-fit adapters are present and serviceable

a. **Packing Container.**

(1) Enough padding is used between items to prevent metal-to-metal contact. Special care is given to fragile items (such as radios).

(2) Weapons that are too long to fit into the container are

disassembled, and the parts are wrapped in padding.

(3) A combat pack or sleeping roll is placed in the bottom, which will hit the ground first to cushion the load.

(4) Related items are packed as one load.

(5) The heaviest items of equipment are loaded at the bottom of the container.

b. **Closing Container.** The side panels are folded over the contents. The bottom of the container is folded (into an S-pattern) to the desired length. The running ends of the three horizontal securing straps are passed over the container and fastened to the appropriate quick-fit adapters (using quick-release folds). The running ends of the two vertical securing straps are passed over the S-fold at the bottom of the container and fastened in a like manner.

6-31. HARNESS ASSEMBLY ATTACHED TO CONTAINER

The harness assembly is laid down with the inside portion facing up. All straps are straightened. The container is placed on the harness assembly. (The word TOP faces up. The arrow points toward the top of the harness assembly.)

a. The top and middle horizontal securing straps are placed around the container. The parachutist ensures that they are routed through (not over) the carrying straps. Each securing strap is fastened to the appropriate quick-fit adapters with a quick-release fold.

b. The bottom horizontal securing strap is placed around the container and secured to its quick-fit adapter. The two vertical securing straps are placed around the container. The parachutist ensures the securing straps are routed through (not over) the carrying straps, and are fastened to the appropriate quick-fit adapters with quick-release folds. The quick-fit adapters pass under the top carrying handle, and the cable and conduit assembly.

c. The side securing strap is placed around the bottom of the container, over the two vertical securing straps, and fastened to the appropriate quick-fit adapter with a quick-release fold.

d. The parachutist stands the entire assembly on end, top up, tightens all securing straps, and tapes any excess webbing. The release knob (red ball attached to the harness assembly) is then pulled out.

e. The quick-release, quick-fit connecting links are inserted into the female part of the side fasteners on the harness assembly. The release knob, when pushed in, allows the cable to engage the claws in the hole

of the quick-release, quick-fit connecting links.

f. The safety pin is inserted into the recess in the release knob from either side.

g. The looped end of the lowering line is threaded through the V-ring and under the carrying handle on top of the harness assembly. The entire length of the lowering line is pulled back through the loop and then pulled tight (Figure 6-29).

h. The HPT lowering line is folded, stowed in its container, and attached to the top carrying handle with two retainer bands.

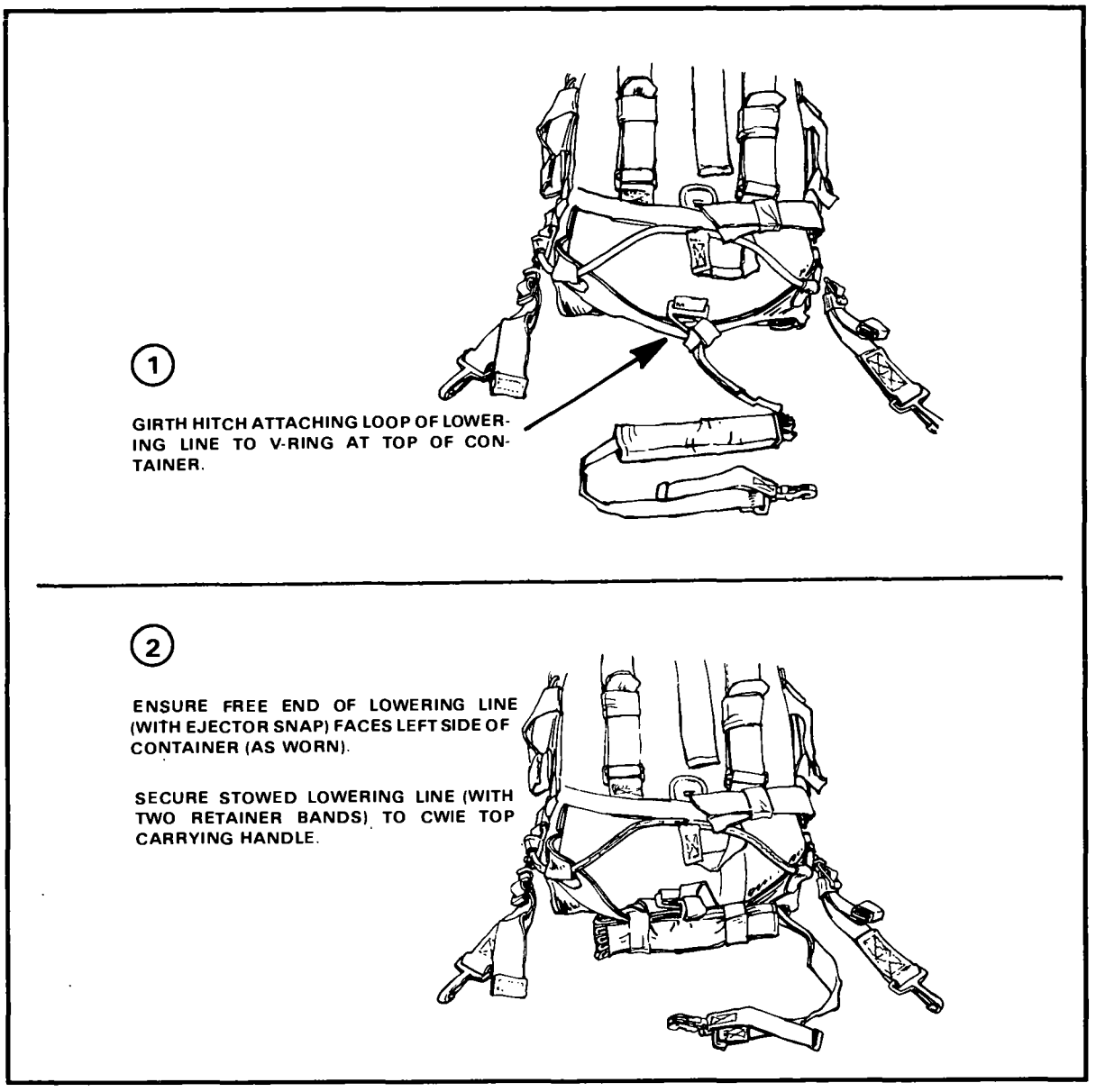

1
GIRTH HITCH ATTACHING LOOP OF LOWERING LINE TO V-RING AT TOP OF CONTAINER.
2
ENSURE FREE END OF LOWERING LINE (WITH EJECTOR SNAP) FACES LEFT SIDE OF CONTAINER (AS WORN).
SECURE STOWED LOWERING LINE (WITH TWO RETAINER BANDS) TO CWIE TOP CARRYING HANDLE.

Figure 6-29. HPT lowering line attached to CWIE.

6-32. CONTAINER AND ASSEMBLY ATTACHED TO PARACHUTIST

The snap hooks of the quick-release straps are attached to the D-rings on the parachute harness. The parachutist ensures that the snap hooks are positioned to the outside of the connector snaps of the reserve parachute. The leg retaining strap is fastened around the leg (left leg, right door; right leg, left door), through the friction adapter, and a quick-release fold is made. The quick-ejector snap on the HPT lowering line is attached to the lowering line adapter web on the left side of the parachute harness.

6-33. CONTAINER RELEASED

After leaving the aircraft, the parachutist executes the first two points of performance. He executes the third point of performance and releases the leg retaining strap. He checks below to ensure that no other parachutists are in the way. The parachutist removes the safety pin from the red release knob (when about 200 feet to 100 feet above the ground). He pulls the red release knob up and out, allowing the container to drop the full length of the lowering line.

6-34. INCENDIARY ROCKET PACK, M202A1

Major components of the M202A1 include the launcher and a four-round 66-mm rocket clip (Figure 6-30).

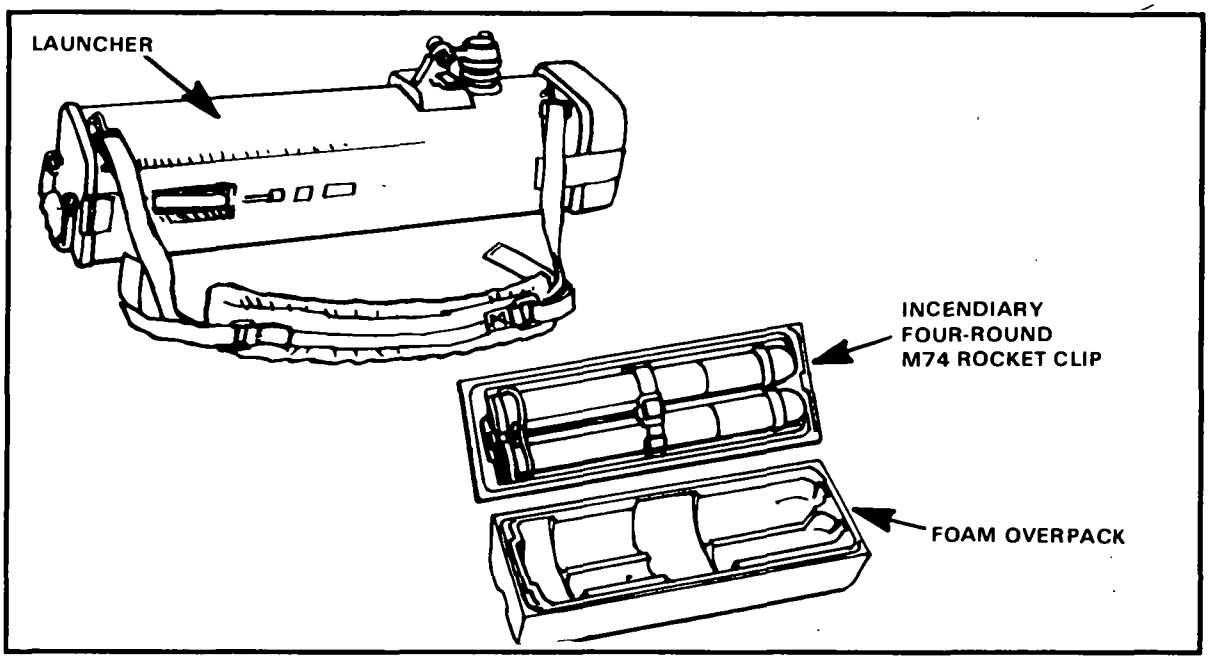


Figure 6-30. Launcher and rockets.

a. The launcher and rocket clip (separated) are packed in two CWIEs (due to the dimensions of each piece). The launcher is 28 inches long, 8.3 inches high, and 7.5 inches wide. It weighs about 13 pounds. The rocket clip (factory packed in a foam overpack) is 23.3 inches long, 8.5 inches high, 8.3 inches wide, and weighs about 18 pounds.

b. The launcher is configured in its carrying mode and placed inside a CWIE; no additional padding is required. The rocket clip (in its foam overpack) is placed inside a CWIE; no additional padding is required.

Section XI. DRAGON MISSILE JUMP PACK

The Dragon (M47) missile jump pack (DMJP) is designed to carry one missile system and the M16A1 rifle with the M203 grenade launcher (Figure 6-31). The jump pack consists of a pack body constructed of nylon duck with 1/4-inch felt material, nylon securing straps, lowering line, and quick-release assembly.

6-35. MISSILE AND TRACKER

The missile and tracker can be jumped in two configurations. They can be rigged to be lowered as individual items, requiring two lowering lines or tandem rigged on a single lowering line. The tandem rig requires the DMJP/AT4JP MOD HPT lowering line and modifications to the jump pack.

a. The DMJP is restricted to parachutists who are at least 5 feet 6 inches tall due to the length of the missile and the difficulties in handling and moving the equipment around in the aircraft. The DMJP cannot be jumped from any aircraft that requires the parachutist to sit on the aircraft floor.

b. When the jump pack is rigged with the missile and an M16A1/M203, it is 11 1/2 inches in diameter, and weighs about 40 pounds. It is secured vertically by a quick—release assembly to the left D-ring of the parachutist's harness. To prevent the pack from swaying during the parachutist's exit from the aircraft or from the opening shock of the parachute, two tie-downs are provided. The upper tie-down is routed around the main lift web, directly below the chest strap, while the lower tie-down secures the pack to the parachutist's left leg.

c. An HPT lowering line assembly is issued with the jump pack and can only be used to lower the DMJP as a single item. Tandem lowering requires the modified HPT lowering line. The loop end of the lowering line is attached to the lowering line attaching strap on the jump pack, and the quick-ejector snap is attached to the lowering line adapter web.

d. Upon landing, the parachutist can rapidly get to the weapons by pulling the running ends of the quick-releases on the (three) horizontal securing straps and (three) adjustable end straps.

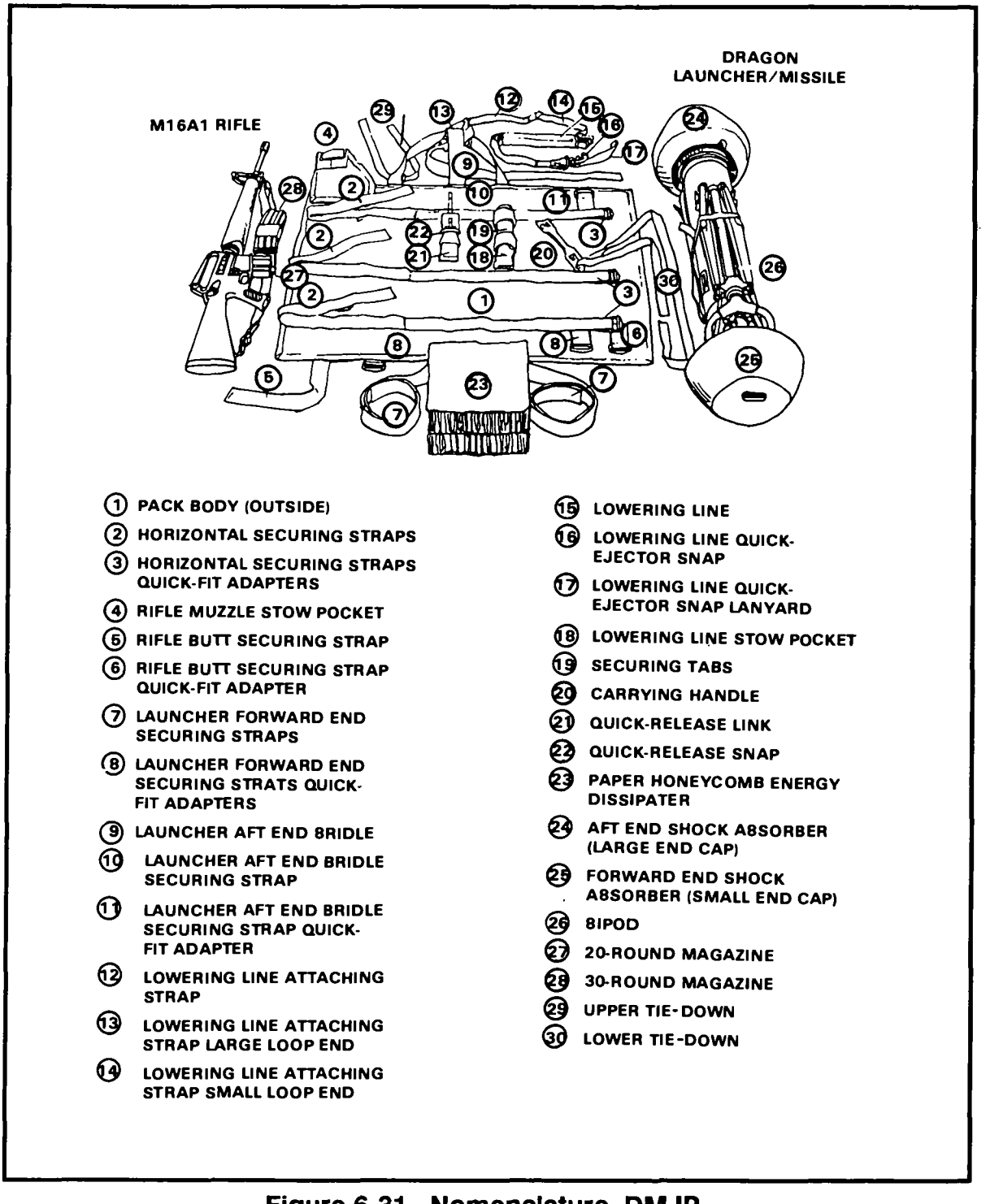

DRAGON LAUNCHER/MISSILE
M16A1 RIFLE
1 PACK BODY (OUTSIDE)
2 HORIZONTAL SECURING STRAPS
3 HORIZONTAL SECURING STRAPS QUICK-FIT ADAPTERS
4 RIFLE MUZZLE STOW POCKET
5 RIFLE BUTT SECURING STRAP
6 RIFLE BUTT SECURING STRAP QUICK-FIT ADAPTER
7 LAUNCHER FORWARD END SECURING STRAPS
8 LAUNCHER FORWARD END SECURING STRATS QUICK-FIT ADAPTERS
9 LAUNCHER AFT END BRIDLE
10 LAUNCHER AFT END BRIDLE SECURING STRAP
11 LAUNCHER AFT END BRIDLE SECURING STRAP QUICK-FIT ADAPTER
12 LOWERING LINE ATTACHING STRAP
13 LOWERING LINE ATTACHING STRAP LARGE LOOP END
14 LOWERING LINE ATTACHING STRAP SMALL LOOP END
15 LOWERING LINE
16 LOWERING LINE QUICK-EJECTOR SNAP
17 LOWERING LINE QUICK-EJECTOR SNAP LANYARD
18 LOWERING LINE STOW POCKET
19 SECURING TABS
20 CARRYING HANDLE
21 QUICK-RELEASE LINK
22 QUICK-RELEASE SNAP
23 PAPER HONEYCOMB ENERGY DISSIPATER
24 AFT END SHOCK ABSORBER (LARGE END CAP)
25 FORWARD END SHOCK ABSORBER (SMALL END CAP)
26 BIPOD
27 20-ROUND MAGAZINE
28 30-ROUND MAGAZINE
29 UPPER TIE-DOWN
30 LOWER TIE-DOWN

Figure 6-31. Nomenclature, DMJP.

6-36. JUMP PACK RIGGED

A detailed explanation of rigging the jump pack is as follows.

a. Position the Dragon Missile.

(1) Place the pack with the felt side of the pack body facing up and extend all straps.

(2) Position the missile in the pack with the bipod facing up (Figure 6-32).

(3) Fit the aft shock absorber (large end) into thenonadjustable launcher aft end bridle of the jump pack.

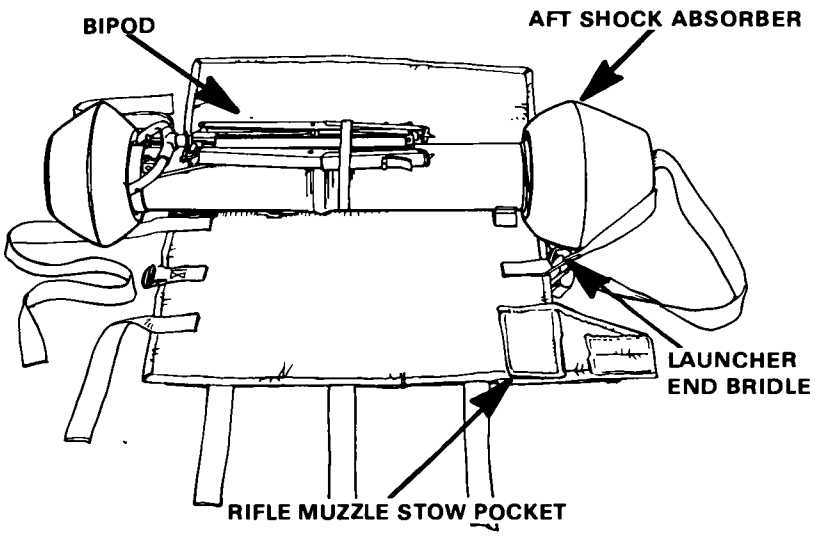


Figure 6-32. Missile being positioned.

b. Position the Rifle.

(1) Insert a 20-round magazine into the rifle magazine well (optional).

(2) Secure a 30-round magazine to the sling of the rifle, using adhesive tape (optional).

(3) Position the rifle on top of the pack, and on top of the missile bipod by inserting the rifle muzzle into the rifle muzzle stow pocket. The butt of the rifle pistol grip lies along the inner edge of the jump pack (Figures 6-33 and 6-34).

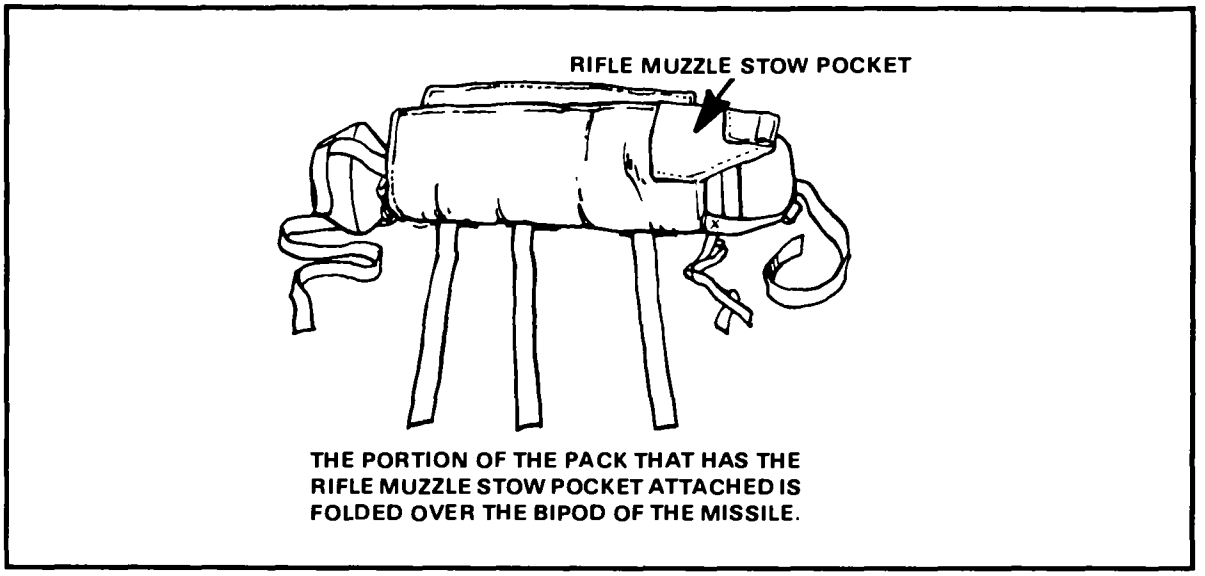

RIFLE MUZZLE STOW POCKET
THE PORTION OF THE PACK THAT HAS THE RIFLE MUZZLE STOW POCKET ATTACHED IS FOLDED OVER THE BIPOD OF THE MISSILE.

Figure 6-33. Rifle positioned.

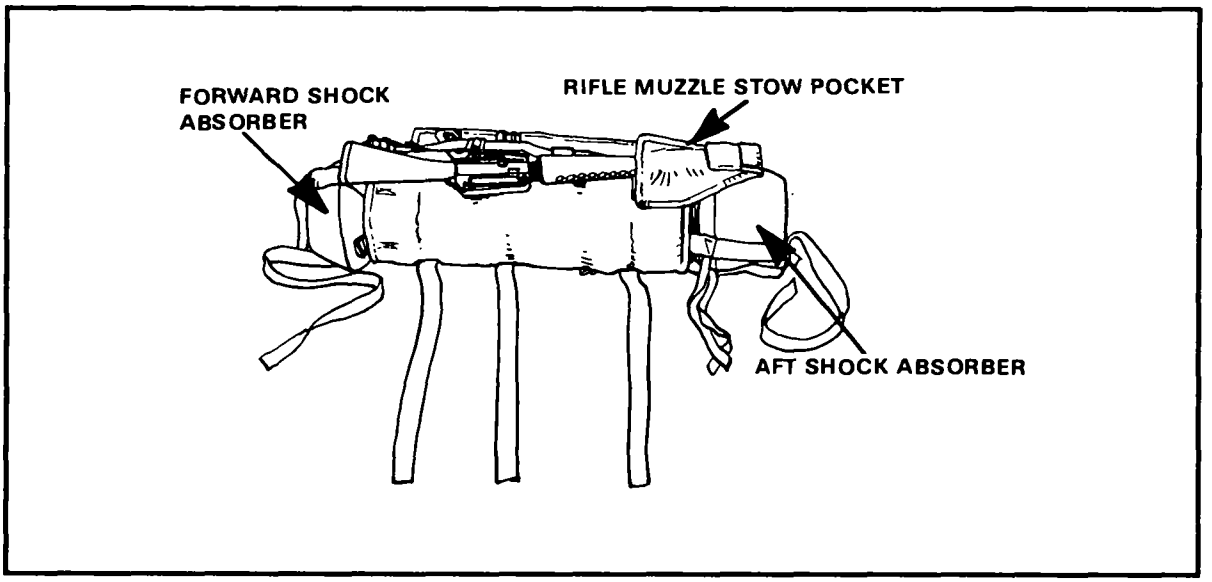


Figure 6-34. Pack folded.

c. Close the Pack.

(1) Fold the outer flap of the jump pack over the rifle (if packed).

(2) Route the (three) horizontal securing straps through the quick-fit adapters using a quick-release fold, but do not tighten.

(3) Route the rifle butt securing strap through the quick-fit adapter. Tighten the strap as much as possible, using a quick-release fold (Figure 6-35).

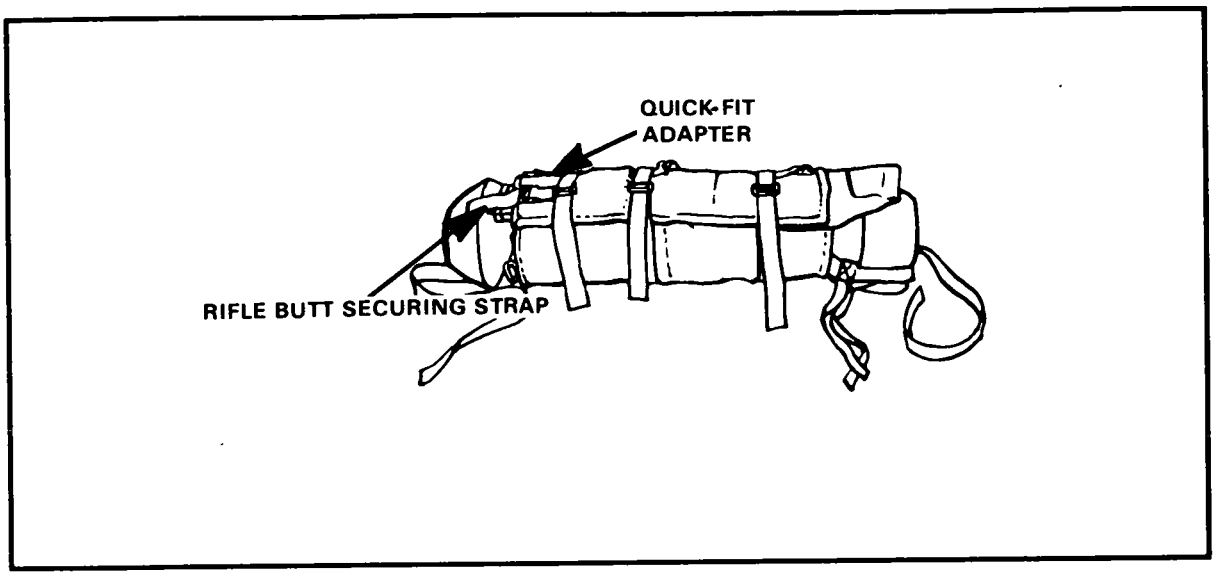


Figure 6-35. Pack closed.

d. Secure Honeycomb Squares.

(1) Route the launcher aft end bridle securing strap through its quick-fit adapter and tighten using a quick-release fold.

(2) Secure two 9-inch-square blocks of cardboard honeycomb across the forward shock absorber of the missile, using the launcher forward end securing straps. Tighten the straps and form an X over the center of the honeycomb. Secure the straps using a quick-release fold (Figure 6-36).

WARNING: NEVER JUMP A LIVE MISSILE WITHOUT THIS HONEYCOMB IN PLACE AND SECURELY FASTENED. PLACE PARACHUTISTS WITH DMJPs OR CWIEs TO THE FRONT OF THE STICK. STAGGERED EXITS ARE DIFFICULT TO CONTROL IF INDIVIDUALS CARRYING EITHER THE DMJP OR CWIE ARE NOT NEAR THE FRONT OF THE STICKS.

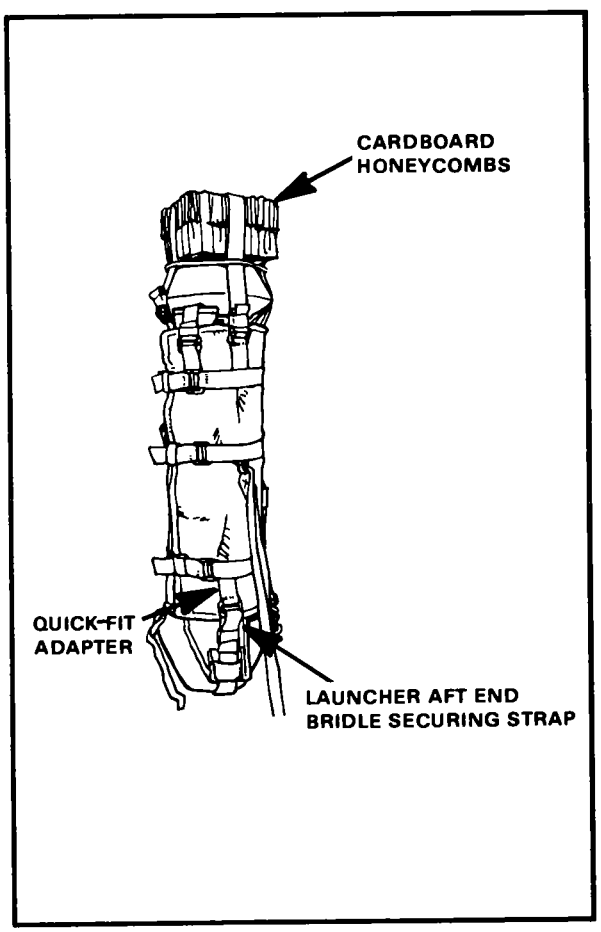


Figure 6-36. Honeycomb squares secured.

(3) If not already installed, attach the lowering line attach-ing strap to the launcher aft end bridle by means of a girth hitch with the large loop end (Figure 6-37). Run the small loop end through the large loop end and tighten (run the small loop end toward the lowering line stow pocket).

Figure 6-37. Lowering line attaching strap installed.

(4) Position the DMJP on the aft end shock absorber and retighten the launcher forward end securing straps using quick-release folds. Secure the running ends with 1/4-inch cotton webbing. Retighten one turn of 1/4-inch, 80-pound test cotton tape in an X pattern around the launcher forward end securing straps and tie securely (Figure 6-38).

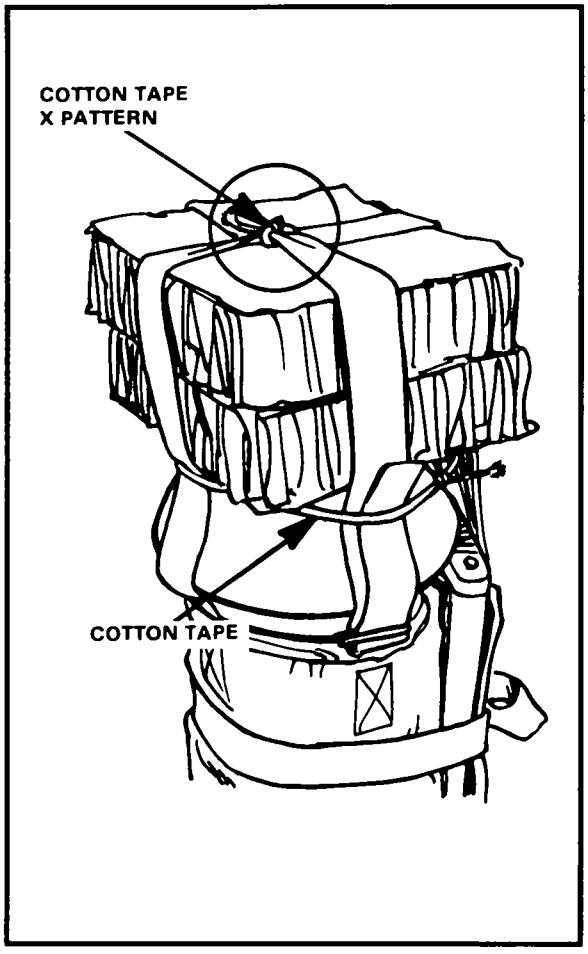


Figure 6-38. X pattern.

(5) Tie one turn of 1/4-inch, 80-pound test cotton tape around the launcher forward end, securing straps below the 9-inch-square honeycomb. Make a tight tie to prevent the honeycomb from shifting.

(6) Position the DMJP on the honeycomb, and tighten the

launcher aft end bridle securing strap. Secure its running end with 1/4-inch cotton webbing.

(7) Tighten the (three) horizontal securing straps as evenly as possible around the weapon(s).

(8) Attach the quick-release assembly to the pack (Figure 6-39).

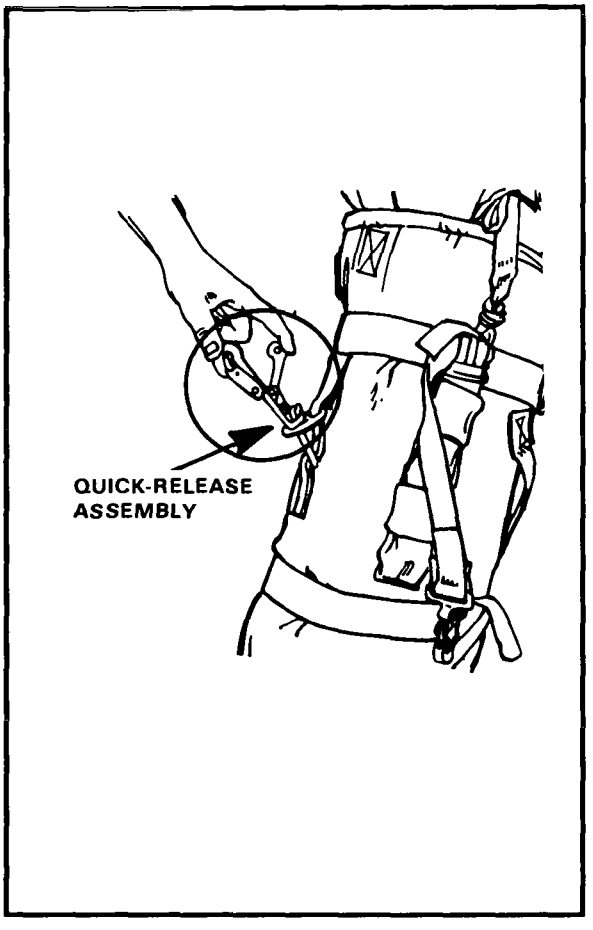


Figure 6-39. Quick-release assembly.

NOTE: Apply more tension to the end strap by tightening the (three) horizontal securing straps evenly. Uneven or insufficient tension can cause misalignment of the overlap portion of the pack and result in improper retention and protection of the rifle.

e. Attach Lowering Line to DMJP.

(1) Attach the lowering line to the lowering line attaching strap by routing the loop of the lowering line through the loop of the lowering line attaching strap (Figure 6-40). Route the lowering line through its own loop and pull tight, forming a girth hitch.

(2) S-fold and place the lowering line inside the lowering line stow pocket (Figure 6-41). Tighten the securing tabs (Figure 6-42). The quick—ejector snap end of the HPT lowering line protrudes from the lowering line stow pocket.

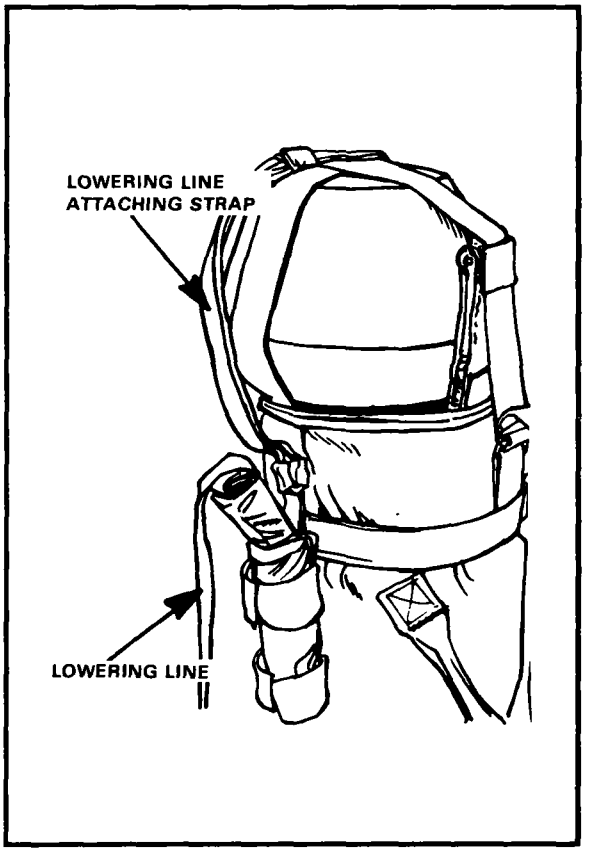


Figure 6-40. Lowering line attached.

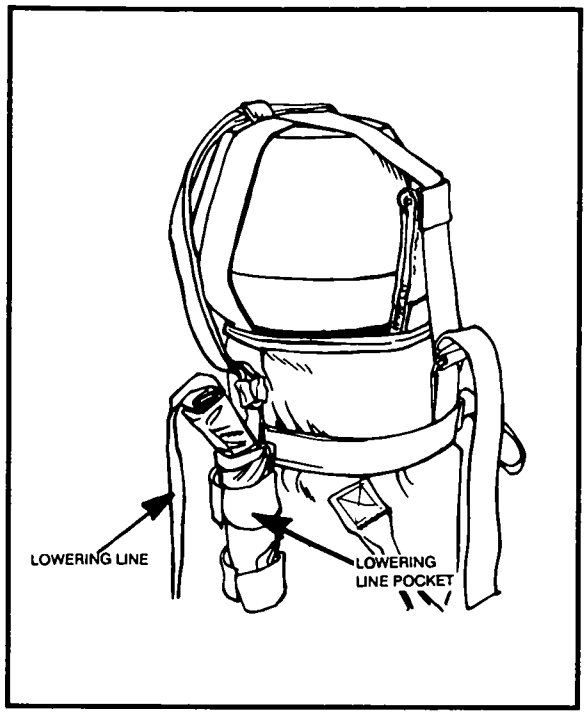


Figure 6-41. Lowering line inserted in pocket.

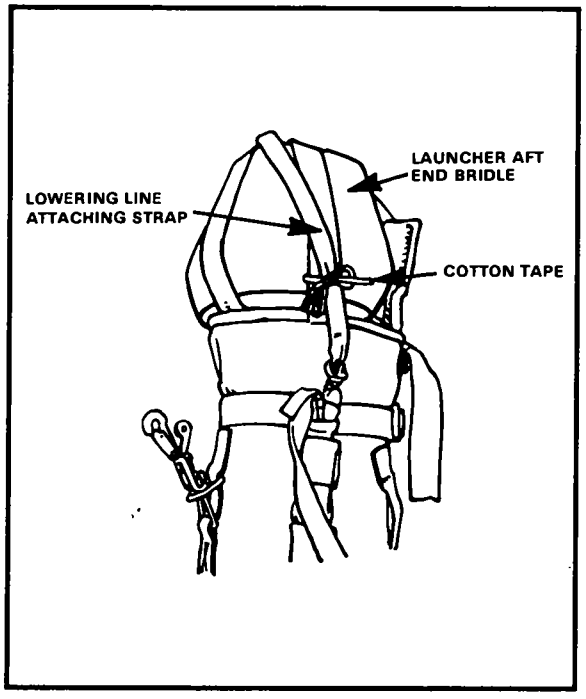


Figure 6-42. Lowering line attaching strap secured.

(3) Install one turn of 1/4-inch, 80-pound test cotton tape around the lowering line attaching strap and the adjacent launcher aft end bridle strap, and tie securely.

6-37. DMJP ATTACHED TO THE PARACHUTIST

The DMJP is the last item attached to the parachutist.

a. The DMJP is secured to the parachutist by attaching the quick-release assembly to the parachutist's left D-ring as the outermost item (Figure 6-43).

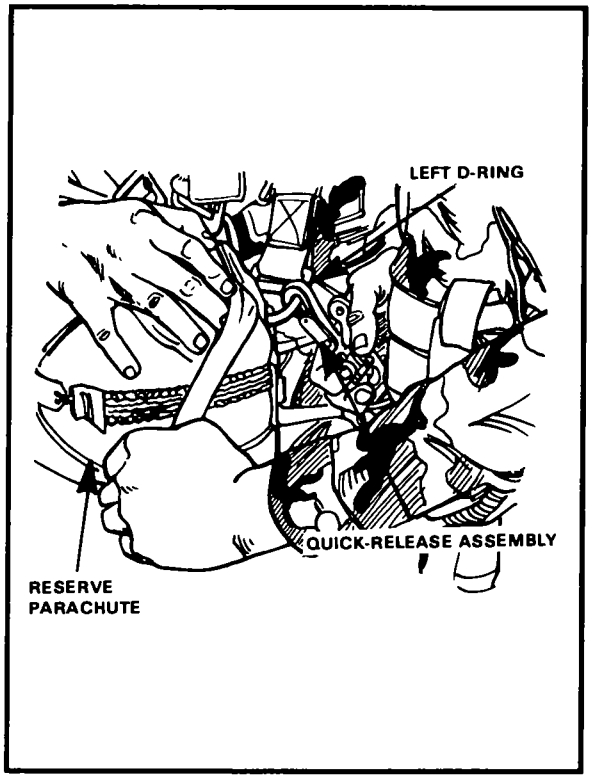


Figure 6-43. DMJP attached.

WARNING: THE QUICK-RELEASE OPENING GATE SAFETY GATE IS CLOSED AND LOCKS THE QUICK-RELEASE SNAP TO THE LEFT D-RING. THE QUICK-RELEASE ASSEMBLY ACTIVATING ARM IS FULLY SEATED (DO NOT SAFETY TIE).

b. The lower tie-down tape is routed around the DMJP and the parachutist's left leg (Figure 6-44). A single-loop bowknot is tied on the front of the DMJP where it is easy for the parachutist to reach (Figure 6-45).

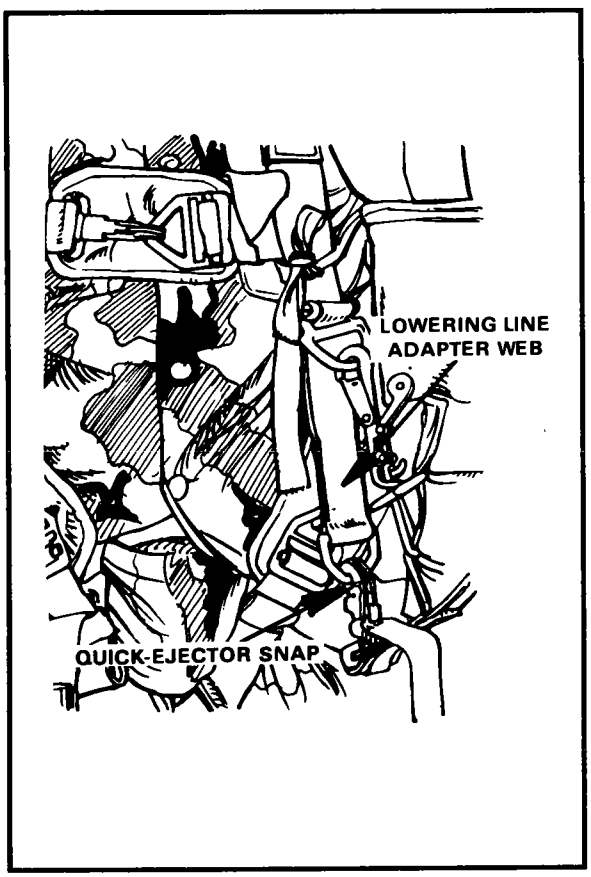


Figure 6-44. HPT lowering line attached.

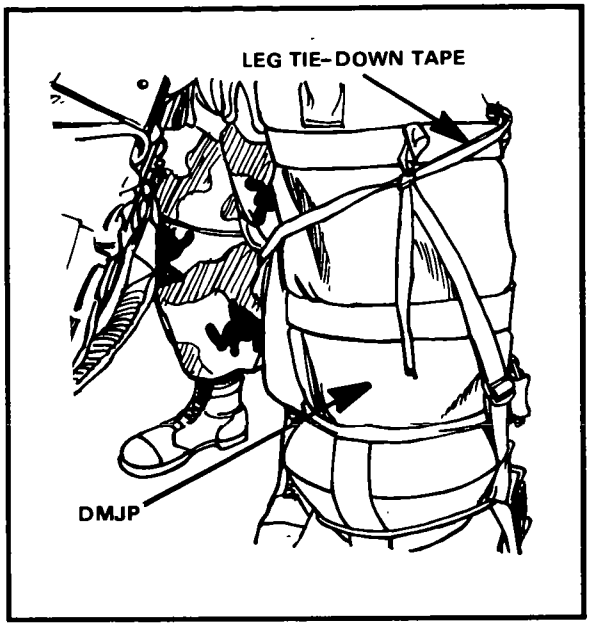


Figure 6-45. Lower tie-down.

c. The upper tie-down tape is routed around the left main lift web directly below the chest strap. It is tied snugly with a single-loop bowknot (Figure 6-46).

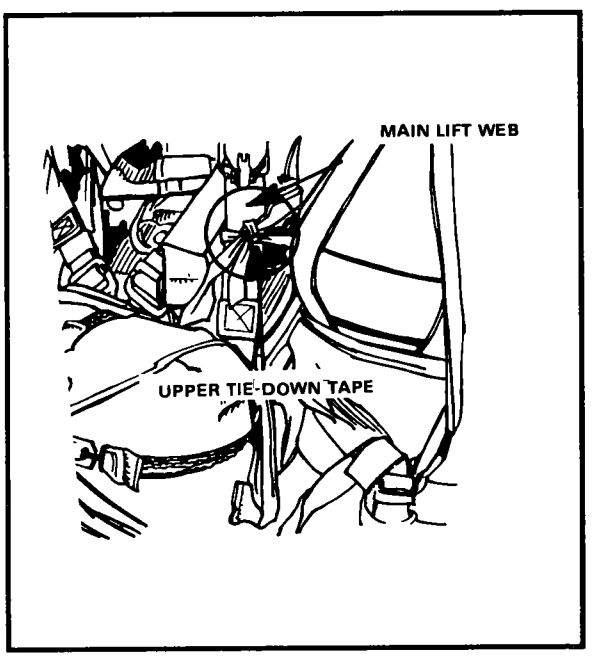


Figure 6-46. Upper tie-down.

6-38. INDIVIDUAL JUMP PROCEDURES

The DMJP is jumped with a front-mounted ALICE pack (Figure 6-47).

Figure 6-47. DMJP attached to parachutist.

a. At the 20-minute time warning, one of the safety personnel attaches the DMJP to the parachutist and inspects it.

b. After leaving the aircraft, the parachutist –

(1) Releases the lower (leg) tie-down, then the upper tie-down in sequence. If either tie malfunctions and the parachutist must ride the missile down, it is important that the missile be vertical, not hanging directly below the feet.

(2) Looks to see that the area below is clear (about 200 to 100 feet above ground), and activates the DMJP quick-release snap by using the left hand to push down and away on the activating arm, allowing it to fall the length of the lowering line.

NOTE: To jettison the DMJP in an emergency, the parachutist lowers the pack, then pulls out on the yellow lanyard attached to the quick-ejector snap, allowing the missile pack to fall free.

6-39. DRAGON TRACKER

The tracker (sighting system) is placed inside the large ALICE pack and is attached to the parachutist. The system must remain in its protective case during the jump.

6-40. DMJP AND ALICE PACK RIGGED AS A TANDEM LOAD

To rig the DMJP and ALICE pack for lowering, modifications are required along with the DMJP/AT4PP modified HPT lowering line.

a. **Materials.**

(1) Fastener tape, pile, color OG 106, 1-inch width, Class 1, MIL-F-21840, NSN 8315-00-106-5974.

(2) Fastener tape, hook, color OG 106, 1-inch width, Class 1, Type II, MIL-F-21840, NSN 8315-00-106-5973.

(3) Webbing, textile, nylon, Type X, Class 1, 1 23/32-inch width, color olive drab, MIL-W-4088, and Class R, MIL-W-27265, NSN 8305-00-261-8584.

(4) Thread, nylon, color OD-S1, conforming to Type II, Class A, Size 3, 800-yard tube of V-T-295, NSN 8310-00-559-5212.

(5) D-ring, parachute harness, Dwg. No. 11-1-485.

b. **Stitching Requirements.**

(1) Stitching must conform to FED-STD-751, Type 301, 5 to 8 stitches per inch.

(2) Ends of stitching must be overstitched not less than 1/2 inch.

c. **Modification Procedure.**

(1) Replacement of the V-ring with D-ring, 11-1-485.

(a) Place the jump pack on a repair table, positioning it so the outside faces upward.

(b) Cut the box X-stitching on the chape web end, which secures the V-ring to the pack. Remove the V-ring and cut the stitching.

(c) Pass the end of the chape through replacement D-ring 11-1-485 and stitch with the box X-stitch formation to pack as in the original construction.

(2) Attachment of the D-ring 11-1-485 and web chape to aft shock absorber harness cross adjustable strap.

(a) If installed, remove the lowering line attaching web, which is girth-hitched to the aft shock absorber harness cross straps.

(b) Cut a 7 1/4-inch length of Type X nylon webbing and sear cut ends to prevent fraying.

(c) Place marks 3 inches from each end and in the center of the webbing.

(d) Place marks 3 5/8 inches from each side of the center of the aft harness cross adjustable strap.

(e) Pass the end of 7 1/4-inch Type X nylon webbing through the D-ring 11-1-485 loop and position it between the markings of the aft harness cross adjustable strap. Stitch with a 3-inch 4-point WW stitch formation at each end.

(3) Attachment of hook and pile lowering line retainer.

(a) Cut a 3 1/2-inch length of hook tape.

(b) Cut a 4-inch length of pile tape.

(c) With hook and pile facing each other, overlap tabs 1 3/4 inches and press together.

(d) Place marks 1 and 2 inches (on the inside) from the binding edge of the pack body on the aft cross adjustable strap.

(e) With pile side facing toward outside of pack and hook facing to inside of pack, position edges of tape overlap even with cross strap edges between markings and stitch to cross strap with a single box stitch formation.

6-41. ALICE LARGE PACK JUMPED WITH DMJP

The ALICE large pack with frame must be jumped with the DMJP to stabilize the DMJP and to accommodate the Dragon tracker assembly.

a. Completely pad the tracker assembly with cellulose wadding to prevent damage.

b. Place the padded tracker assembly in the inside pouch with soft articles of clothing or equipment packed around it. Place additional items in the pouch, with hard and sharp items padded.

c. Fill the outside ALICE pockets with nonfragile items to capacity, since the filled pockets aid the positioning and prevent slippage of the H-harness during parachute opening and lowering line deployment.

d. Close the pack by use of the drawstring closure, engaging the securing straps and attachment of pocket snap fasteners.

e. Adjust the shoulder straps as small as possible and wrap excess around the lower portion of the vertical bar on the pack frame. Route the running ends of the waist straps over the shoulder straps and fasten them behind the upper portion of the vertical bar on the pack frame. This secures the ALICE straps, reducing the possibility of entanglement on board and during aircraft exit.

f. To stow the Dragon modified lowering line, S-fold the lowering line neatly on top of the web inside the retainer, ensuring that ends are stacked evenly with the retainer outer edges. Secure the pile tab on web located 46 inches from the quick-ejector snap end to hook the extension on the retainer. Fold the hook side of flap tightly over the S-folded lowering line and, holding it firmly, fold pile side of the flap over and secure hook and pile together. Secure the pile extension on the flap retainer to the hook tab at the loop end of the lowering line.

6-42. ALICE PACK RIGGED WITH FRAME

Turn the pack upside down.

a. Place the modified H-harness on the pack so that the cross straps are in front of the pack and the friction adapters are touching (or near) the bottom of the pack frame.

(1) Run the harness straps over the top of the packload and then under the top portion of the frame.

(2) Run the harness straps over the horizontal bar of the frame and cross at the center of the back of the pack.

(3) Run the straps under the frame and secure them to the friction adapters, forming a quick release.

b. To attach the lowering line after rigging pack, girth-hitch the lowering line loop at the intersection of the crossed H-harness straps (at the rear, center of the pack).

(1) Place a safety tie (one turn of 80-pound test, 1/4 inch wide cotton webbing) around the girth hitch and the X formed by the crossed H-harness straps. This ensures that the loop end of the lowering line does not slide up or down the H-harness.

(2) Secure the stowed lowering line to the left side (as worn on the parachutist) on the keepers of the pack with two turns of masking tape or two sets of retainer bands. The lowering line ejector snap faces up and to the right or left.

(3) Thread the (H-harness) D-ring attaching straps through the intermediate friction adapters, forming a quick-release with the running ends that are pointing away from the parachutist.

6-43. DMJP RIGGED

Rig the DMJP as described above, omitting installation of the lowering line attaching web.

6-44. ALICE PACK ATTACHED TO THE PARACHUTIST

Attach the D-ring attaching strap snap hooks (on rigged ALICE) to the harness D-rings outside of the reserve connector snaps.

6-45. DMJP RIGGED FOR TANDEM LOAD

Stand the rigged DMJP next to the parachutist's left side.

a. To secure the 15-foot HPT lowering line, grasp the quick-ejector snap of lowering line. Route (from bottom to top) it through the D-ring openings at the pack body and aft end locations. Position the 18-inch strata blue marking on the HPT lowering line even with the D-ring on top of the DMJP (Figure 6-48).

b. Secure the lowering line to the aft cross strap at the pack body end by folding the hook tab over the lowering line, and fastening pile together.

c. Attach the quick-release snap by inserting the top of link through the top opening of the D-ring and attach the hook of the quick-release snap through the link opening and close. The snap opening must face away from the pack (Figure 6-48).

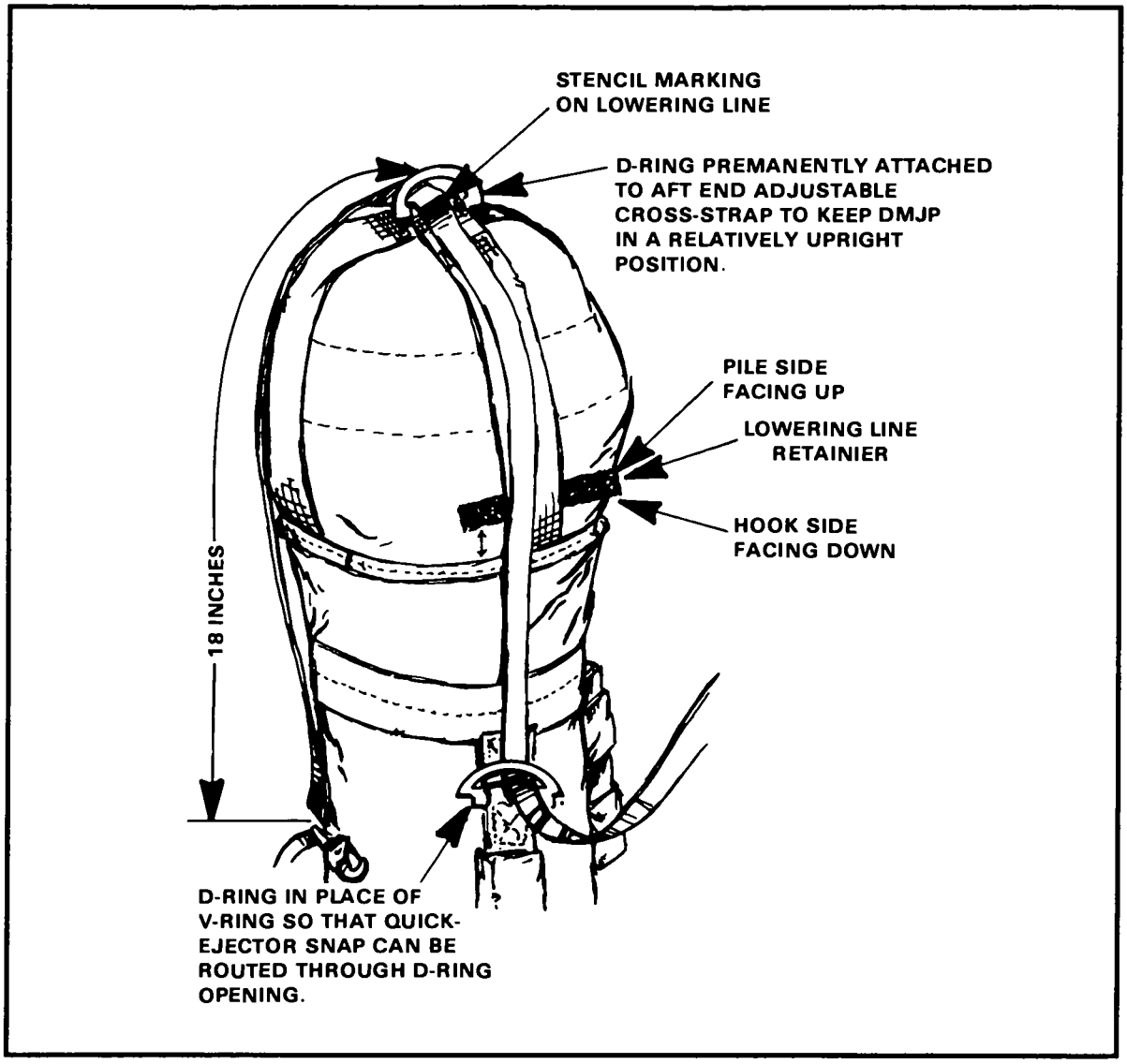

STENCIL MARKING ON LOWERING LINE
D-RING PREMANENTLY ATTACHED TO AFT END ADJUSTABLE CROSS-STRAP TO KEEP DMJP IN A RELATIVELY UPRIGHT POSITION.
PILE SIDE FACING UP
LOWERING LINE RETAINIER
HOOK SIDE FACING DOWN
18 INCHES
D-RING IN PLACE OF V-RING SO THAT QUICK-EJECTOR SNAP CAN BE ROUTED THROUGH D-RING OPENING.

Figure 6-48. DMJP modified with D-ring.

6-46. DMJP ATTACHED TO PARACHUTIST

Attach the DMJP quick-release assembly to the left harness D-ring outside of the reserve connector snap and H-harness snap (Figure 6-49). Attach the 15-foot HPT lowering line quick-ejector snap to the left adapter web equipment ring (under the reserve parachute). Route the

leg tie-down tape around the DMJP and the parachutist's left leg. Tie with a double-loop bowknot on the front of the DMJP where it is easy for the parachutist to reach. Route the upper tie-down tape under and around the left main lift web directly below the chest-strap. Tie snugly with a double-loop bowknot.

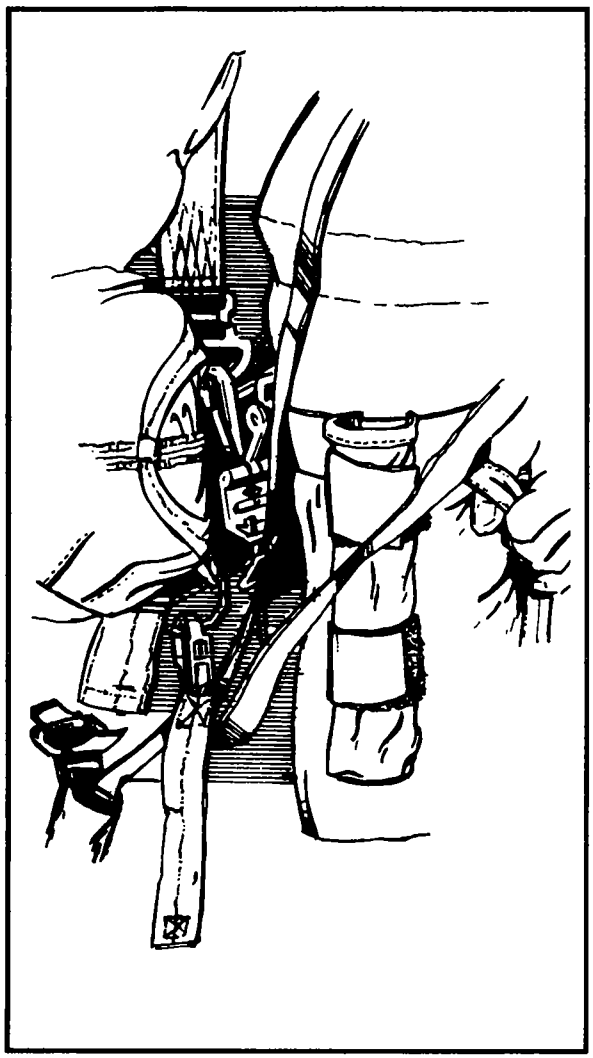


Figure 6-49. DMJP tandem lowering line attached to parachutist.

NOTE: On the improved harness, ensure that the upper tie-down tape is routed below the cheststrap.

6-47. ALICE AND DMJP RELEASED

Untie the upper and lower tie-down tapes on the DMJP. Release the leg tie-down on the ALICE pack. Drop the ALICE pack by simultaneously pulling the quick-release folds on the D-ring attaching straps, allowing the pack to fall to the end of the line. Pull the handle on the quick-release snap of the DMJP so the DMJP slides down the lowering line to the end of the lowering line/ALICE pack.

NOTE: To jettison the ALICE and DMJP in an emergency, the parachutist (after performing the above) lifts the reserve up and jerks the yellow tab on the lowering line quick-ejector snap, allowing the ALICE/DMJP to fall free.

WARNING: UNDER NO CIRCUMSTANCES WILL THE PARACHUTIST RELEASE THE DMJP BEFORE RELEASING THE ALICE PACK.

6-48. REMOVAL OF LOWERING LINE

Upon landing, the parachutist removes the lowering line by pulling the line

through the two D-rings, cutting the safety tie, and disassembling the girth hitch on the H-harness. The DMJP MOD lowering line is stored with the DMJP for reuse.

Section XII. AT4 JUMP PACK (AT4JP)

The parachutist's AT4JP is designed to carry one AT4 weapon round (SM136) and one M16 rifle. The jump pack consists of a pack body constructed of nylon and 1/4-inch thick felt material, nylon securing webs, forward- and aft-end cross straps, honeycomb retainer webs, carrying handle, lowering line/pocket and link/D-ring, and snap hook quick-release assembly. When the jump pack is rigged with the AT4 weapon round, M16 rifle, and shock absorber, it is 47 inches long, 9 inches in diameter, and weighs approximately 29 pounds. It is secured vertically by a quick-release snap hook to the left D-ring of the parachutist's harness.

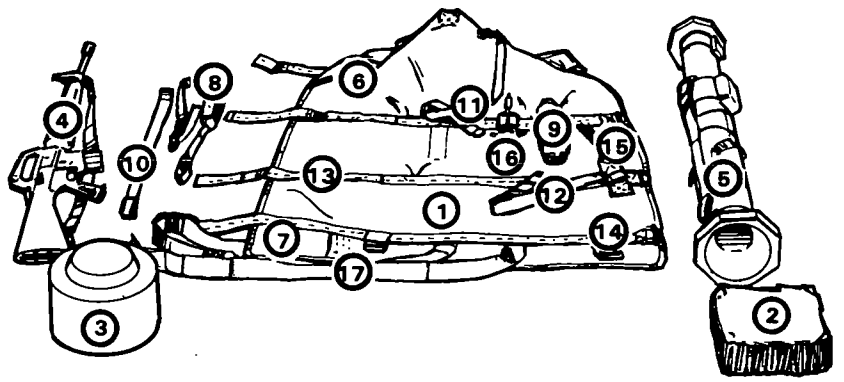
6-49. COMPONENTS

To prevent the jump pack from swaying during the parachutist's exit from the aircraft or the opening shock of the parachute, two tie-down tapes are provided. The upper tie-down secures the pack to the main lift web, while the lower tie-down secures the pack to the parachutist's left leg.

a. A stowage pocket is attached to the exterior of the pack for retaining the 15-foot HPT lowering line. A 24-inch attachment web is issued with the jump pack and is required for assembling the pack and lowering line when rigged for delivery of the AT4JP only. (When the AT4JP and ALICE are rigged for tandem load, a modified [DMJP/AT4] lowering line is required.) The loop end of the lowering line or attachment web (based upon the configuration to be lowered) is attached to the forward end cross D-ring on the jump pack so it will suspend below the parachutist and impact in a vertical position. The quick-ejector snap on the opposite end is attached to the lowering line adapter web ring on the parachutist's harness.

b. The shock absorber (polyurethane/honeycomb) configuration at the aft end of the JP is intended to prevent damage to the AT4 weapon

round during ground impact. Upon landing, the parachutist can rapidly gain access to the weapon round and M16 rifle by pulling the seven quick-release snaps rigged into the jump pack securing webs. The total assembly is shown in Figure 6-50.



1. AT4 JUMP PACK
2. HONEYCOMB
3. LAUNCHER AFT END SHOCK ABSORBER
4. M16 RIFLE
5. AT4 WEAPON
6. RIFLE MUZZLE POCKET
7. RIFLE BUTT POCKET
8. LOWERING LINE
9. LOWERING LINE POCKET
10. LOWERING LINE ATTACHMENT WEB
11. UPPER TIEDOWN TAPE
12. LEG TIEDOWN TAPE
13. SIDE SECURING STRAPS
14. QUICK-FIT ADAPTER
15. CARRYING HANDLE
16. LINE/D-RING, SNAP HOOK, QUICK RELEASE
17. LAUNCHER AFT END SECURING STRAPS

Figure 6-50. AT4 nomenclature

6-50. JUMP PACK RIGGED

To prepare the pack, lay the pack down with the felt side of the pack facing up and extend all of the securing webs.

a. Positioning the AT4 Weapon Round.

(1) Position the weapon round on the pack with the carrying sling facing down, and the launcher forward end (small) fitted into the nonadjustable pack cross strap with the launcher aft end (large) centered on the middle adjusting strap (Figure 6-51).

(2) Ensure that the launcher forward end (small) fits snugly into the nonadjustable pack cross strap.

(3) Fold the portion of the pack that has the rifle muzzle and butt pockets attached over the weapon round.

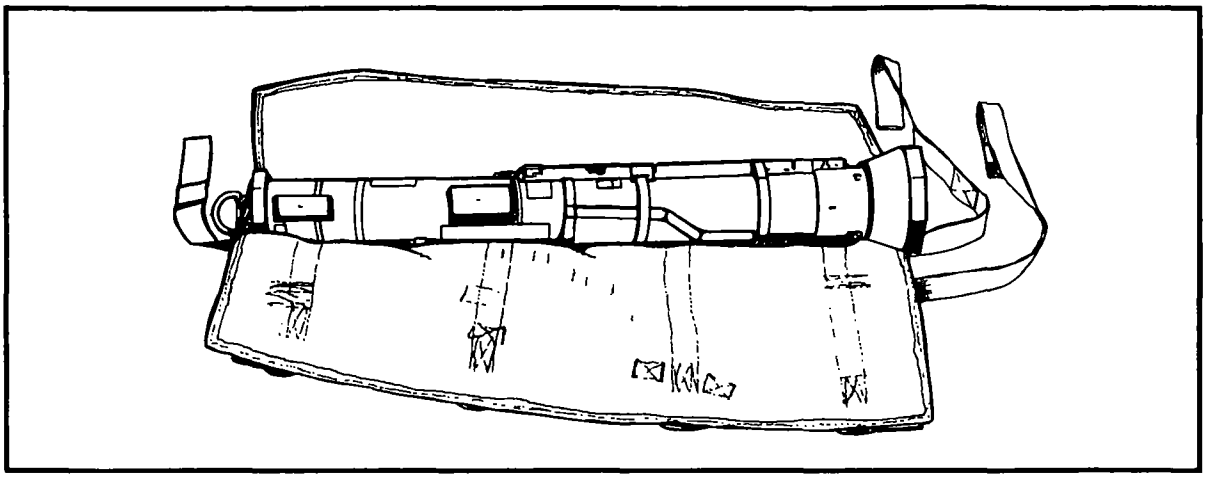


Figure 6-51. AT4 weapon round positioned.

b. Positioning the M16 Rifle.

(1) Insert a 30-round magazine into the rifle (optional).

(2) Secure a 30-round magazine to the sling of the rifle, using adhesive tape (optional).

(3) Insert the rifle muzzle into the muzzle pocket and place the butt in the rifle butt pocket as shown in Figure 6-52. Ensure that the magazine/pistol grip points toward the side securing straps, and the rifle muzzle is inserted into the muzzle pocket as far as possible.

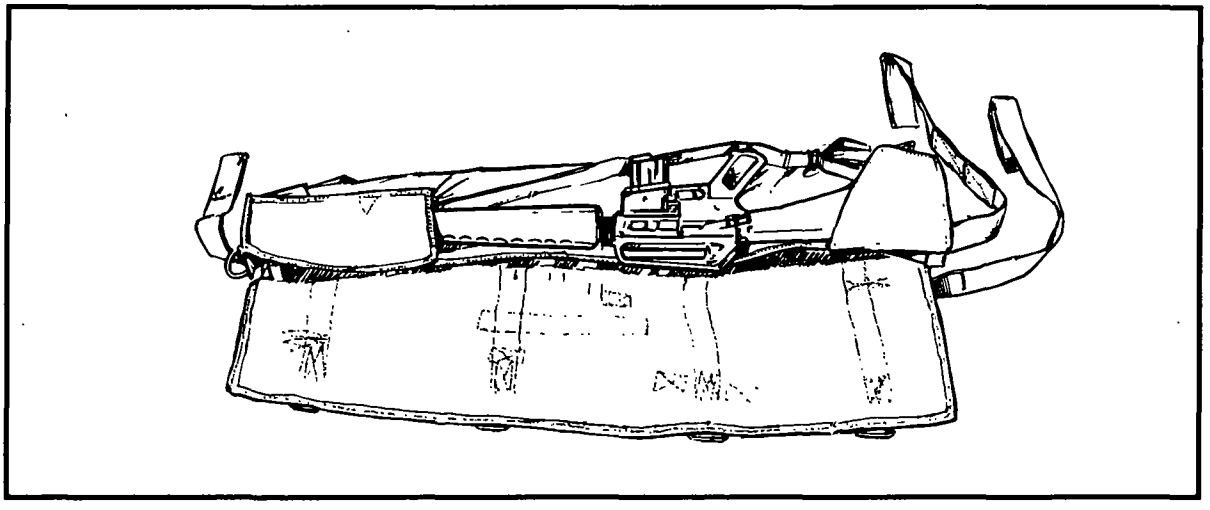


Figure 6-52. Positioning of M16 rifle.

c. Closing the Pack.

(1) Rotate the unfolded portion over the rifle/weapon round snugly.

(2) Route the four side securing straps through the quick-fit adapters and tighten, then thread the end through the adapter, forming a quick-release fold. Accordion fold the running ends and secure with two turns of masking tape (Figure 6-53).

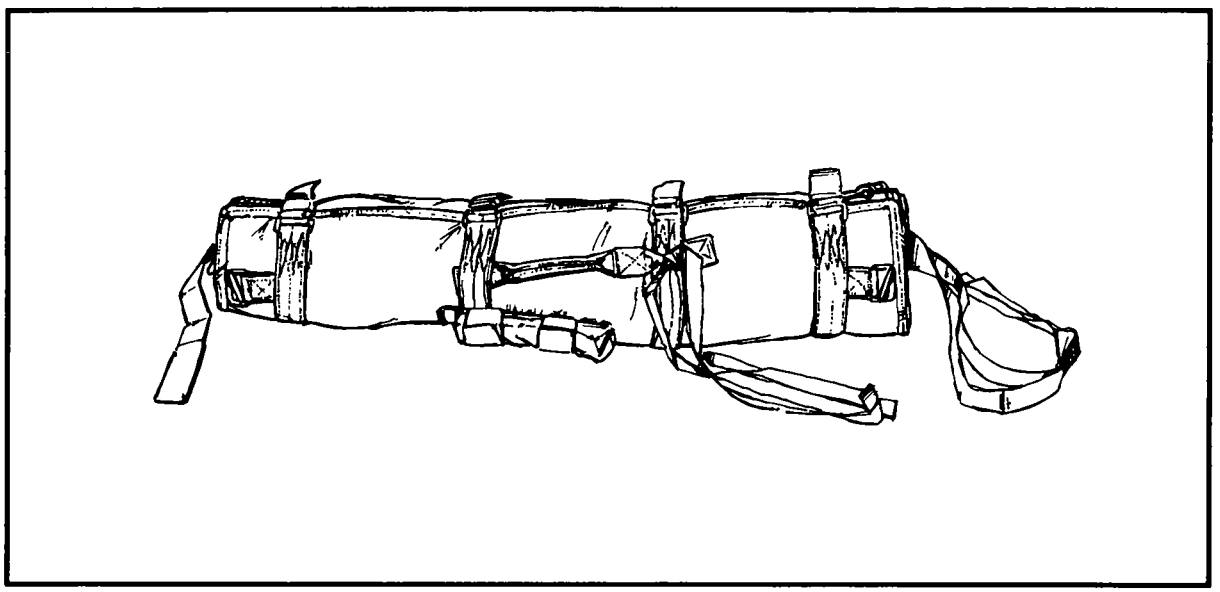


Figure 6-53. Pack closed.

(3) Insert the cone-shaped end of the shock absorber into the launch tube aft end.

(4) Position the 8-inch-square paper honeycomb on the shock absorber flat surface. If not already done, thread the end of the securing strap through the web loop keeper. Route the two aft securing straps over the paper honeycomb through each quick-fit adapter and tighten, then thread the end through the adapter, forming a quick-release fold. Accordion fold the running ends and secure with two turns of masking tape (Figure 6-54).

(5) Route the launcher forward end securing strap under the non-adjustable cross D-ring strap through the quick—fit adapter and tighten. Then thread the end through the adapter, forming a quick-release fold. Accordion fold the running end and secure with two turns of masking tape.

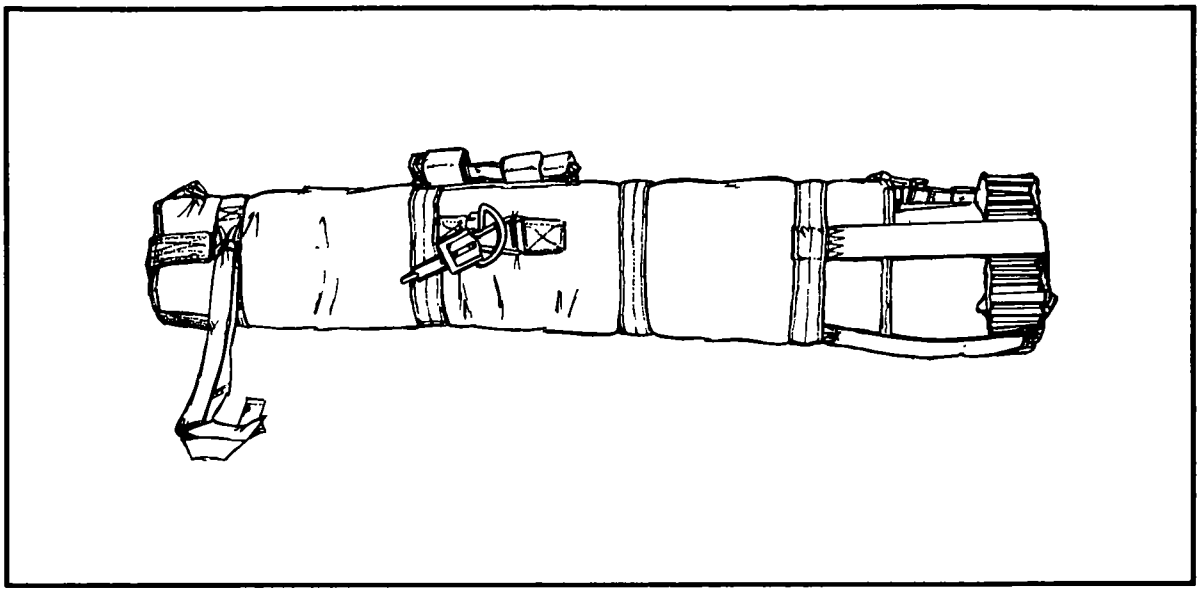


Figure 6-54. Running ends secured.

NOTE: The procedures for rigging the AT4JP vary at this point, depending on the method used to lower the parachutist's equipment. Follow paragraphs 6-51 and 6-52 if a single lowering line (tandem) is used.

6-51. AT4 AND ALICE PACK RIGGED

To attach the quick-release snap, insert the top of the link through the top opening of the D-ring. Attach the hook of the quick-release snap through the link opening and close. The snap opening should face away from the pack (Figure 6-54).

a. Stowing the Standard Lowering Line.

(1) S-fold the lowering line neatly on top of the web inside the retainer, ensuring that ends are stacked evenly with the retainer ouer edges. Secure the pile tab on web located at the quick-ejector snap end to hook extension on retainer.

(2) Fold the hook side of the flap tightly over S-folded lowering line and, holding it firmly, fold the pile side of flap over and secure hook and pile together.

(3) Secure the pile extension on the flap retainer to the hook tab at the loop end of the lowering line (Figure 6-55).

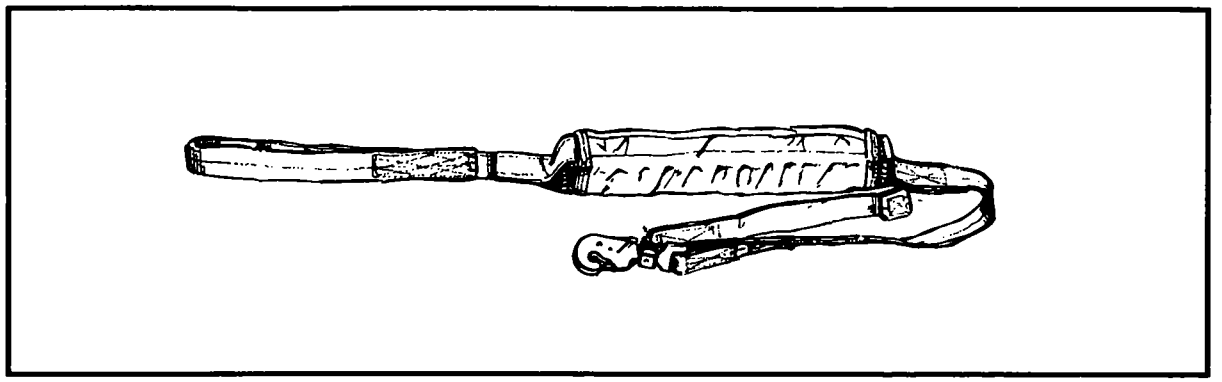


Figure 6-55. Standard lowering line stowed.

NOTE: The hook-and-pile tabs located on the flap retainer and at each end of the stowed lowering line assembly must be secured firmly and without slack to prevent line spillage. To provide a secure closure of the hook and pile, press the firmly, evenly, and smoothly together and without puckers.

b. Securing the Attaching Web to the Standard Lowering Line.

(1) Attach the lowering line to the lowering line attaching web by routing the loop of the lowering line through the small loop end of the lowering line attaching web.

(2) Route the lowering line through its own loop and pull tight (Figure 6-56).

c. Fastening Attaching Web to Forward End Cross Strap D-Ring.

(1) If not already installed, attach the lowering line attaching web to the forward end cross strap D-ring by routing the large loop around the D-ring.

(2) Route the lowering line through the attaching web loop and pull tight (Figure 6-56).

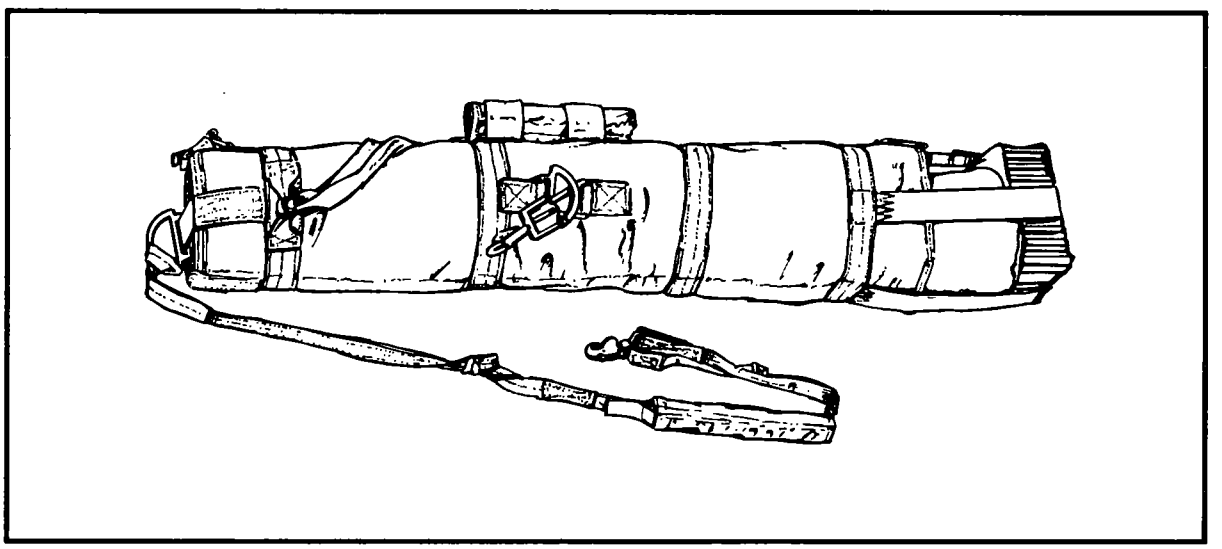


Figure 6-56. Attaching web secured.

d. Stowing the Standard Lowering Line in Pocket.

(1) Insert the lowering line assembly in the lowering line pocket with the attaching web positioned against pack body and quick-ejector snap away from the jump pack.

(2) Fasten the hook-and-pile tabs firmly together around the lowering line pocket (Figure 6-57). The AT4JP is now ready for attachment to the parachutist.

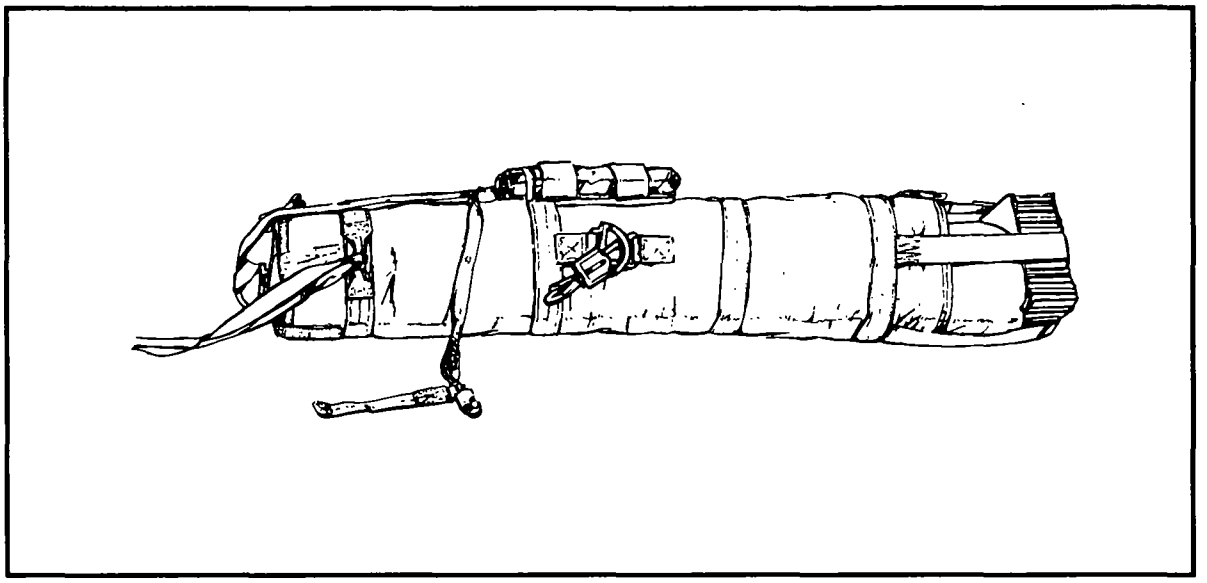


Figure 6-57. Standard lowering line stowed.

NOTE: Before attachment of the reserve parachute, individual equipment, and AT4JP, check to ensure that the canopy release assemblies of the T-10B harness are in the hollows of the parachutist's shoulders for a properly fitted harness. Adjust an improperly fitted harness by repositioning the diagonal backstraps to the size channel that correctly fits the parachutist IAW FM 57-220. A properly adjusted T-10B harness on the parachutist ensures that the reserve parachute, individual equipment, and AT4JP, when attached to the harness, are in the proper position. An improperly fitted harness on the parachutist with a full equipment and weapon load is uncomfortable and could result in problems during ground, aircraft movement/exit, and main parachute deployment.

6-52. EQUIPMENT ATTACHED TO PARACHUTIST (STOWED LOWERING LINE)

To rig the ALICE pack with frame, prepare the parachutist's ALICE pack with frame following procedures listed in paragraph 6-42 with the following exception: secure the stowed lowering line to the right side (as worn on the parachutist) on the vertical pack frame bar in two places with two turns of masking tape or two sets of retainer bands. The lowering line ejector snap faces up and to the right or left.

a. Attach the D-ring attaching strap snap hooks (on rigged ALICE) to the harness D-rings outside of the reserve connector snaps.

b. Secure ALICE pack to the parachutist's leg.

c. Attach the 15-foot HPT lowering line quick-ejector snap from the ALICE to the right adapter web equipment ring.

d. Secure the AT4JP by attaching the quick-release assembly to the left D-ring outboard of the H-harness snap (Figure 6-58). Ensure that the quick-release safety gate is closed and the quick-release snap is locked to the D-ring, and that the quick-release assembly release attachment sequence is inboard to outboard as follows: reserve, H-harness, and AT4JP quick-release snap.

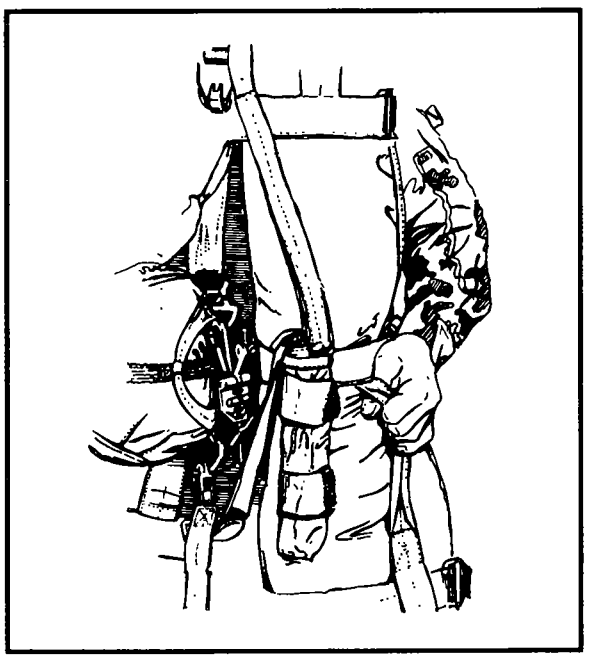


Figure 6-58. AT4JP secured.

e. Route the upper tie-down tape under and around the left main lift web directly below the cheststrap. Tie snugly with a double-loop bowknot on the front of the AT4JP where it is easy for the parachutist to reach.

f. Route the lower tie-down tape around the AT4JP and the left leg. Tie with a double-loop bowknot on the front of the AT4JP where it is easy to reach. (If the HSPR is used, remove lower tie-down on the AT4JP, and route the left leg strap of the HSPR around the outside of the AT4JP, and then retighten.)

6-53. ALICE PACK WITH FRAME AND AT4JP RIGGED

Do not attach the quick-release snap at this point. This will be accomplished during the equipment attaching sequence. To stow the DMJP/AT4JP modified lowering line for tandem load, perform the following:

a. S-fold the lowering line neatly on top of the web inside the retainer, ensuring that ends are stacked evenly with the retainer outer edges.

b. Secure the pile tab on the web located 46 inches from the quick-ejector snap end to hook extension on retainer.

c. Fold the hook side of the flap tightly over S-folded lowering line and, holding it firmly, fold the pile side of

the flap over and secure hook and pile together.

d. Secure the pile extension on the flap retainer to the hook tab at the loop end of the lowering line (Figure 6-59).

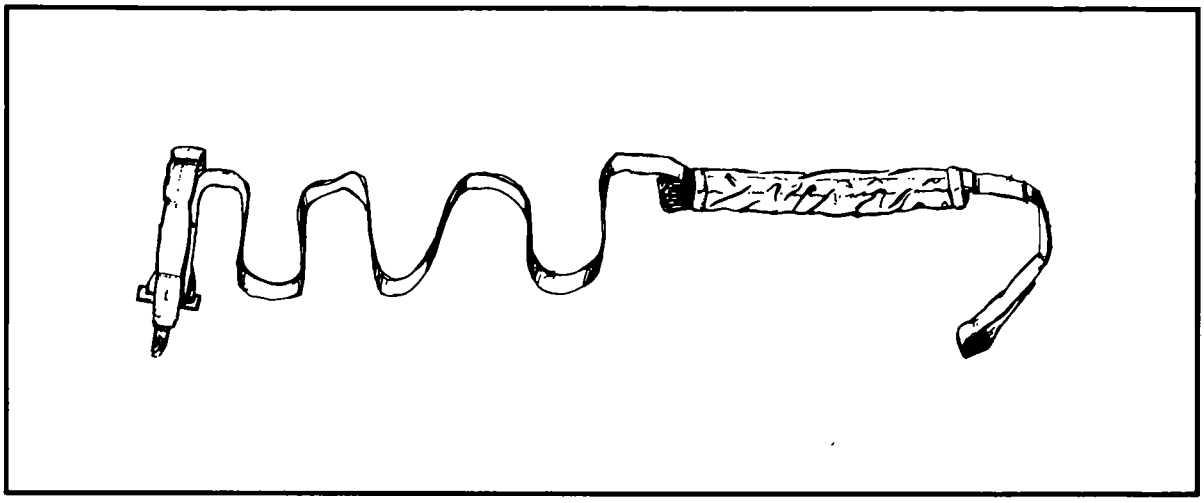


Figure 6-59. Lowering line stowed for tandem load.

6-54. EQUIPMENT ATTACHED TO PARACHUTIST (MODIFIED STOWED LOWERING LINE)

To rig the ALICE pack with frame, prepare the parachutist's ALICE pack with frame following procedures listed in paragraph 6-42 with the following exception: secure the modified stowed lowering line to the left side (as worn on the parachutist) on the vertical pack frame bar in two places with two turns of masking tape or two sets of retainer bands. The lowering line ejector snap faces up and to the right or left.

a. Attach the D-ring attaching strap snap hooks (on rigged ALICE) to the harness D-rings outside of the reserve connector snaps.

b. Secure ALICE pack to the parachutist's leg.

c. Stand the rigged AT4JP next to the parachutist's left side.

d. Grasp the quick-ejector snap of the MOD lowering line already attached to the ALICE and route (from bottom to top) through the D-ring opening at the center of the pack, upper tie-down chape loop, and top D-ring located at the aft end. Position the 18-inch strata blue marking on MOD HPT lowering line even with D-ring on top of AT4JP (Figure 6-60).

e. Attach the quick-release snap to the AT4JP. The snap opening faces away from the pack.

f. Attach the 15-foot MOD HPT lowering line quick-ejector snap to the left adapter web equipment ring.

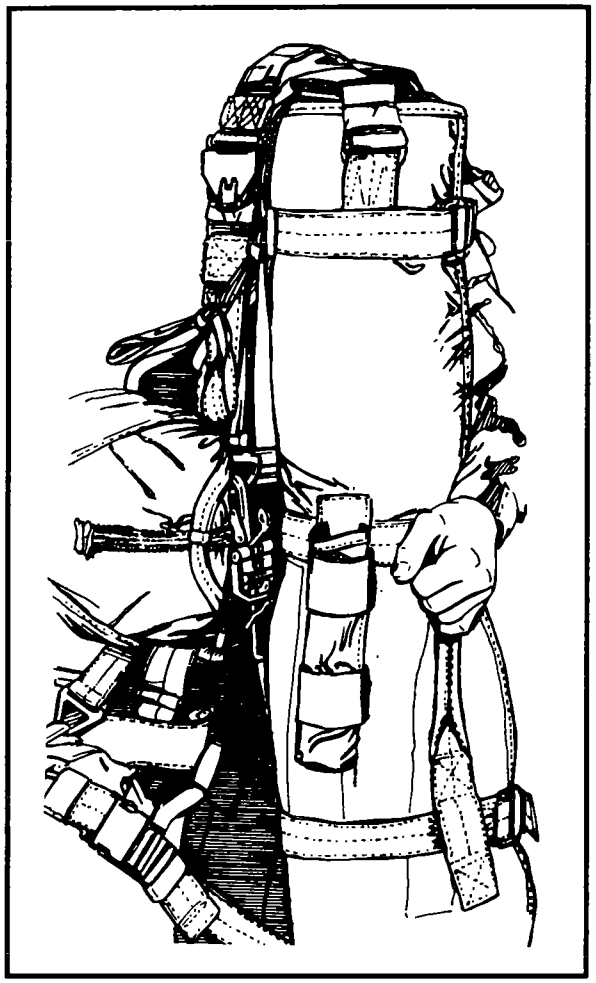


Figure 6-60. Attaching equipment to parachutist.

g. Secure the AT4JP by attaching the quick-release assembly to the left D-ring outboard of the H-harness snap. Ensure that the quick-release safety gate is closed, the quick-release snap is locked to the D-ring, and the quick-release assembly release lever is fully seated (do not safety tie). The harness left D-ring snap attachment sequence is inboard to outboard as follows: reserve, H-harness, and AT4JP quick-release snap.

h. Route the upper tie-down tape under and around the left main lift web directly below the cheststrap. Tie snugly with a double-loop bowknot on the front of the AT4JP where it is easy to reach (Figure 6-61).

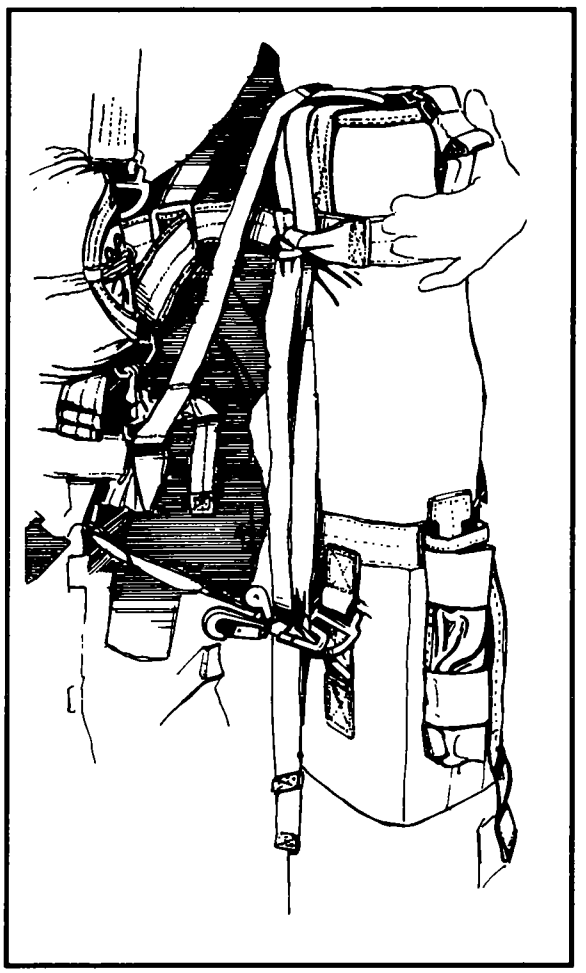


Figure 6-61. Routing upper tie-down.

i. Route the lower tie-down tape around the AT4JP and the left leg. Tie with a double-loop bowknot on

the front of the AT4JP where it is easy to reach. If the HSPR is used, remove lower tie-down on the AT4JP, and route the left leg strap of the HSPR around the outside of the AT4JP and then tighten (Figure 6-62).

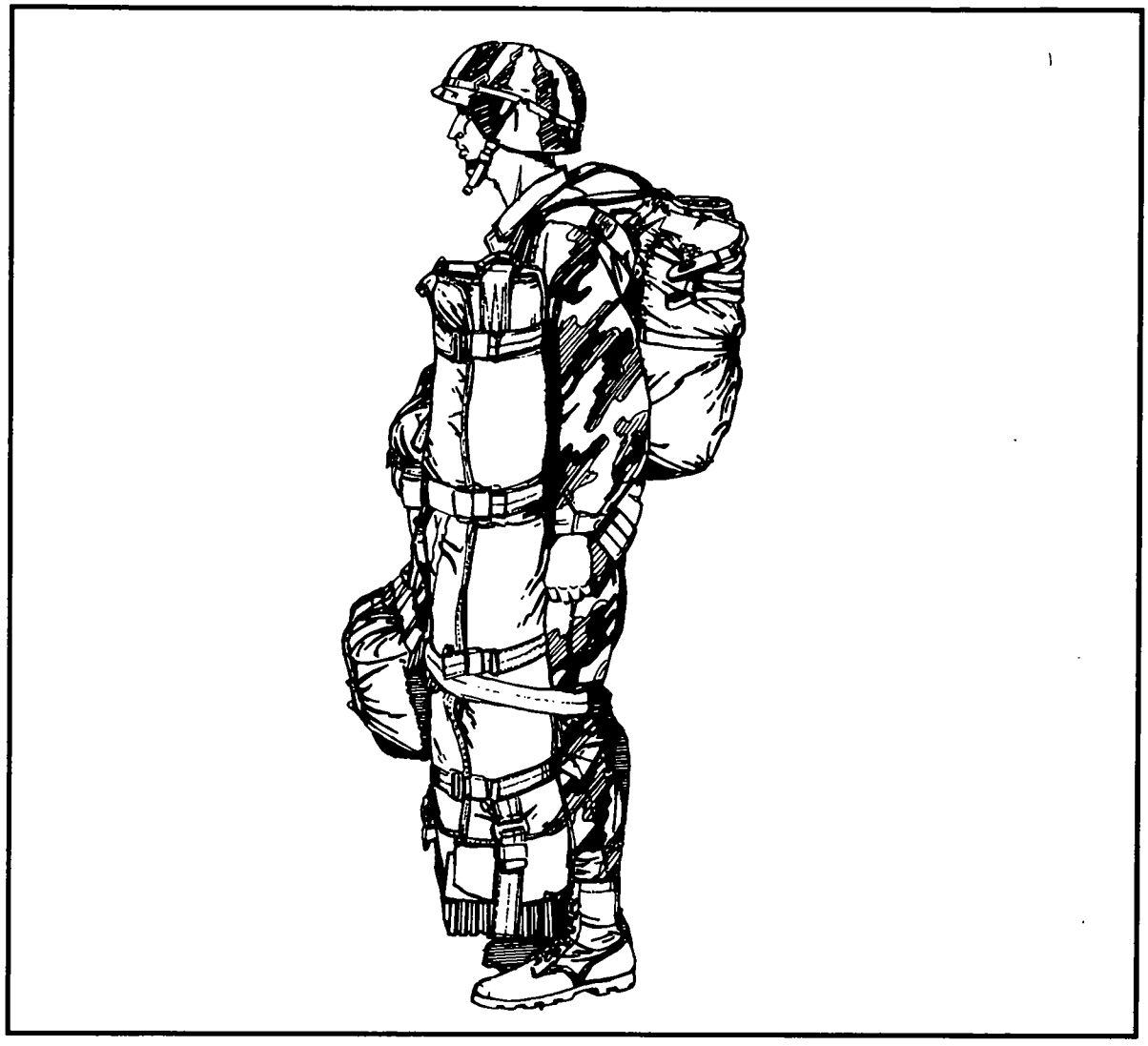


Figure 6-62. Lower tie-down tape routed around AT4JP.

6-55. ALICE AND AT4JP RELEASED

Release the lower and upper tie-downs on the AT4JP.

a. Release the ALICE as follows:

(1) H-harness (modified). Release the leg tie-down on the ALICE pack. About 200 feet above ground, drop the ALICE pack by simultaneously pulling the quick-release folds on the D-ring

attaching straps, allowing the pack to fall to the end of the line.

(2) HSPR. About 200 feet above the ground, grasp the release handle assembly and pull up and out quickly, simultaneously releasing the load from the harness and legs, allowing the load to drop the length of the lowering line. RELEASE THE HANDLE IMMEDIATELY FOLLOWING SEPARATION OF THE LOAD FROM THE PARACHUTIST. Secure the handle for releasing the load to the HSPR with a length of tubular webbing and stay with the HSPR to prevent its loss and separation.

b. Pull the handle on the quick-release snap of the AT4JP to lower the jump pack. The jump pack will either fall to the end of its lowering line or slide down the tandem lowering line to the ALICE pack.

NOTE: To jettison the ALICE and AT4JP in an emergency, the parachutist (after performing the above) lifts the reserve up and jerks the yellow tab on the lowering line quick-ejector snap, allowing the ALICE/AT4JP to fall free.

WARNING: UNDER NO CIRCUMSTANCES WILL THE PARACHUTIST RELEASE THE AT4JP BEFORE RELEASING THE ALICE PACK.

c. Upon landing, remove the lowering line by pulling the line through the two D-rings, cutting the safety tie, and disassembling the girth hitch on the H-harness.

d. Store the AT4JP MOD lowering line and polyether urethane shock absorber with the AT4JP for reuse.

CHAPTER 7

ARCTIC RIGGING

The number of personnel who can be parachuted from a single aircraft is reduced due to the bulk of equipment and cold weather clothing. When computing weight factors, the cold weather equipped parachutist is estimated to weigh 310 pounds.

Section I. EQUIPMENT CONSIDERATIONS

Exiting time between each parachutist is two seconds. Aircraft compartment space required for a parachutist is 1 1/2 times more in cold regions than in temperate climates. (Commanders must be familiar with the airborne operations portion of FM 31-71). Planeside parachute issue and rigging is not possible during winter months due to harsh temperatures.

7-1. WEIGHT FACTORS

Aircraft must be within 200 meters of the parachute rigging facility to prevent rigged jumpers from walking through deep snow/ice during winter months when temperatures are low and the individual parachutist's equipment is the heaviest. The serviceability of the lever on the quick-ejector snap of the HPT lowering line should be checked since there is an increased risk of the lever malfunctioning due to the heavy loads.

7-2. MODIFICATIONS

Modifications of standard equipment must be made for airborne operations under cold weather conditions.

a. **Waistband.** A modified waistband (strap) is used in lieu of the standard waistband when parachuting with snowshoes or skis. The strap consists of two pieces: a 6-foot A-7A strap and a 16-inch strap with a buckle at each end. The skis or snowshoes are attached to the side of the parachutist opposite the static line (to prevent fouling). The modified waistband allows the buckle (for the quick-release fold) to be located on the same (either) side with the snowshoes or skis (Figure 7-1). Tandem loads are

dropped on a single lowering line (rigging or lowering procedures are contained in this chapter). Under arctic conditions, most individual equipment is lowered during descent due to its weight.

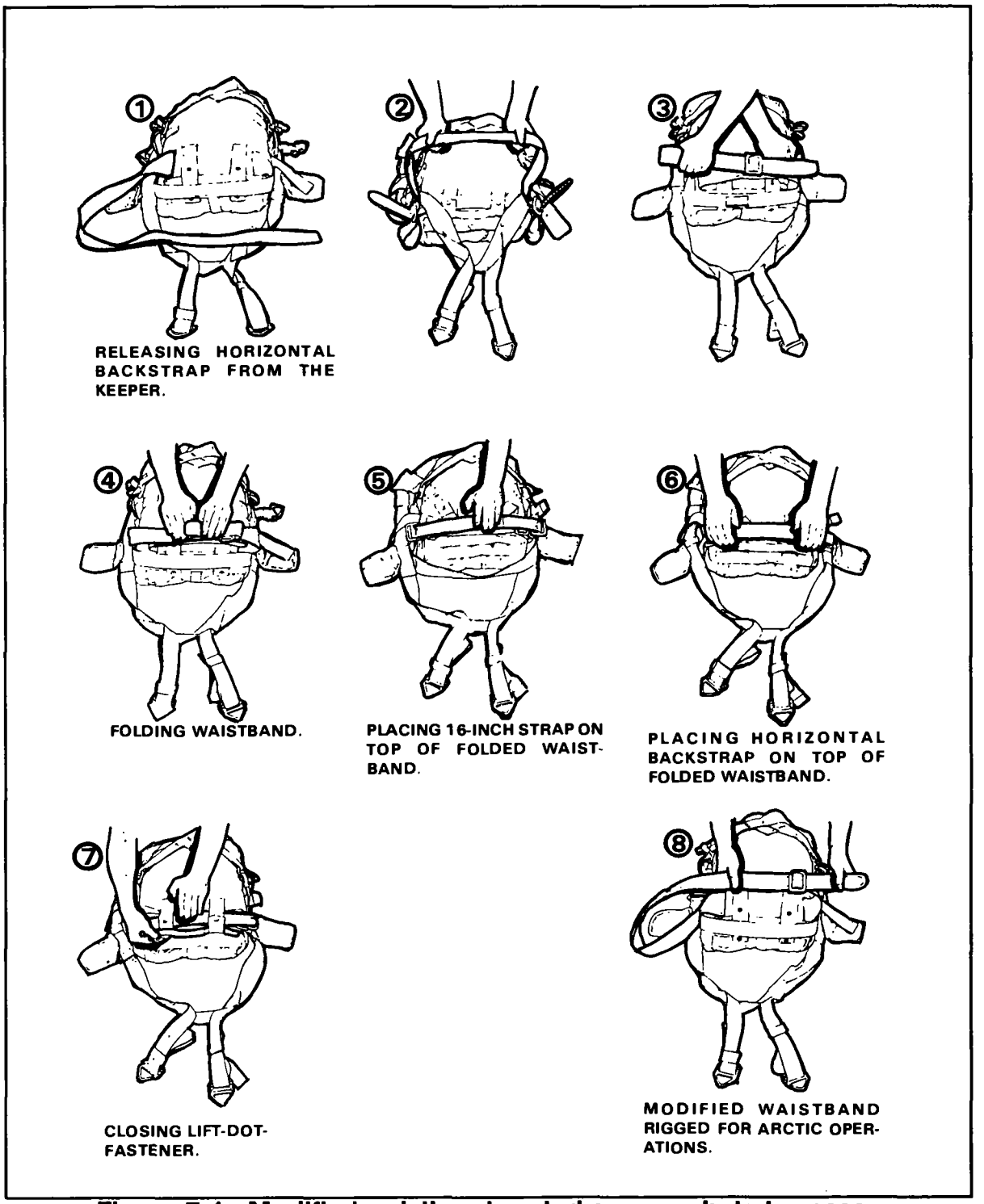


Figure 7-1. Modified waistband routed on parachute harness.

b. **Reserve Parachute.** Deployment of the reserve parachute under arctic conditions may be hindered by the bulkiness of the gloves worn. To overcome this obstacle, the rip cord is inverted. This is an optional requirement. Commanders planning an arctic airborne operation, requesting modified T-10 reserve parachute, must allow enough time for the reserves to be modified.

c. **Mittens.** Arctic mittens are not worn during the parachute jump. Their bulkiness interferes with deployment of the reserve parachute and the lowering of equipment. The mittens are tucked inside the front of the jacket or under the parachute harness. They are not attached to or packed in a container. Trigger-finger mittens are stowed inside the jacket for wear as soon as the jumper is on the ground.

d. **Arctic Canteen.** The arctic canteen poses a hazard due to the long neck and metal body that can injure a jumper if the PLF is executed on top of the canteen. Commanders should consider packing it in the ALICE pack to prevent personal injury or damage to the canteen.

Section II. SNOWSHOES AND INDIVIDUAL WEAPON

Snowshoes are usually rigged on the individual parachutist. This allows the parachutist immediate access to the snowshoes for donning.

7-3. SNOWSHOES WITHOUT WEAPON

The prefitted snowshoes are placed one on top of the other. The heel strap of the lower snowshoe is run underneath the lower shoe and up between the frame and webbing of both snowshoes. The heel strap buckle is brought up similarly on the other side of the snowshoes. A sling may be fabricated using 550-cord (or other suitable material). The snowshoes are secured with an additional tie-down, using 550-cord at the toe (Figure 7-2).

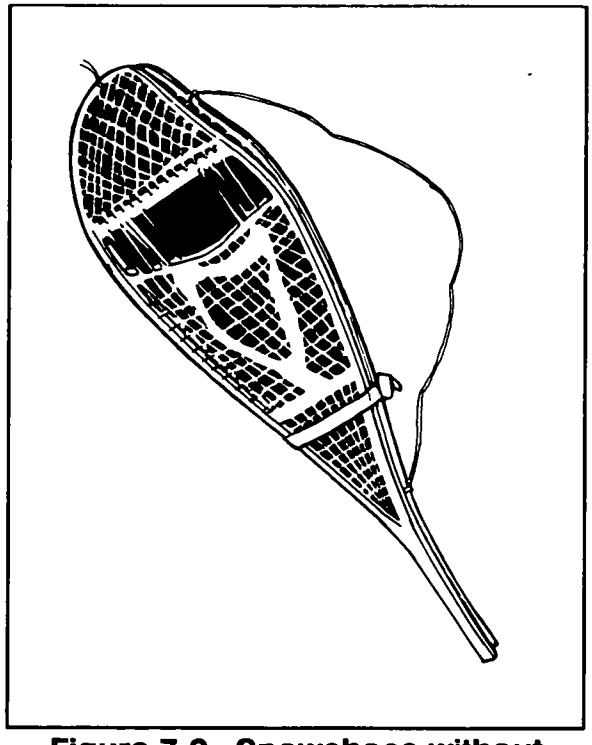


Figure 7-2. Snowshoes without weapon.

7-4. SNOWSHOES WITH WEAPON

The snowshoes are rigged as previously described and the rifle sling is secured. The rifle is placed so that the barrel rests on top of the snowshoe trails with the bolt assist up for left door exit (down when rigged for right door exit). The rifle is secured to the snowshoes (Figure 7-3) by buckling the heel strap around the slip ring and the toe strap around the small of the stock. The barrel is secured to the yoke of the snowshoes with 550-cord, using a bowknot. The M203 grenade launcher is rigged in a similar manner (Figure 7-4).

NOTE: Using this method, the parachutist may exit either a right or left jump door with regard to static line interference, because the weapons container is attached in the normal manner (left side below the shoulder level).

7-5. JUMPING SNOWSHOES WITH M1950 WEAPONS CONTAINER

Snowshoes are attached to the outside of the M1950 with the tails down and the tips of the snowshoes facing the jumper. The 550-cord is used to secure the snowshoes to the M1950 through both the upper and lower tie-down retaining bars. The running ends of the upper tie-down are routed through the toe window on the snowshoes and then around the M1950 to the left side of the main lift web. The M1950 is then attached as the outermost item to the left D-ring (Figure 7-5).

NOTE: Using this method, the modified waistband is not needed. The standard waistband is routed through the waistband retainers of the reserve parachute to the waistband adjuster panel without going around the outside of the snowshoes and M1950. The M1950 is then lowered in the same manner as in a tandem load without snowshoes.

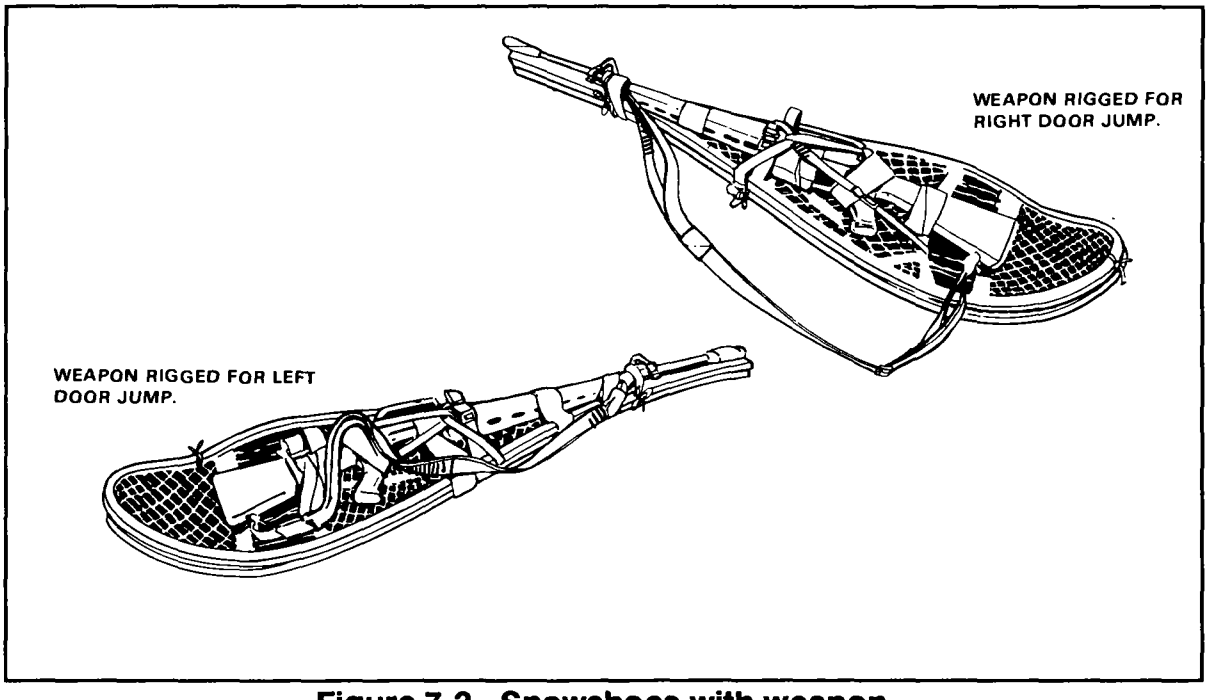


Figure 7-3. Snowshoes with weapon.

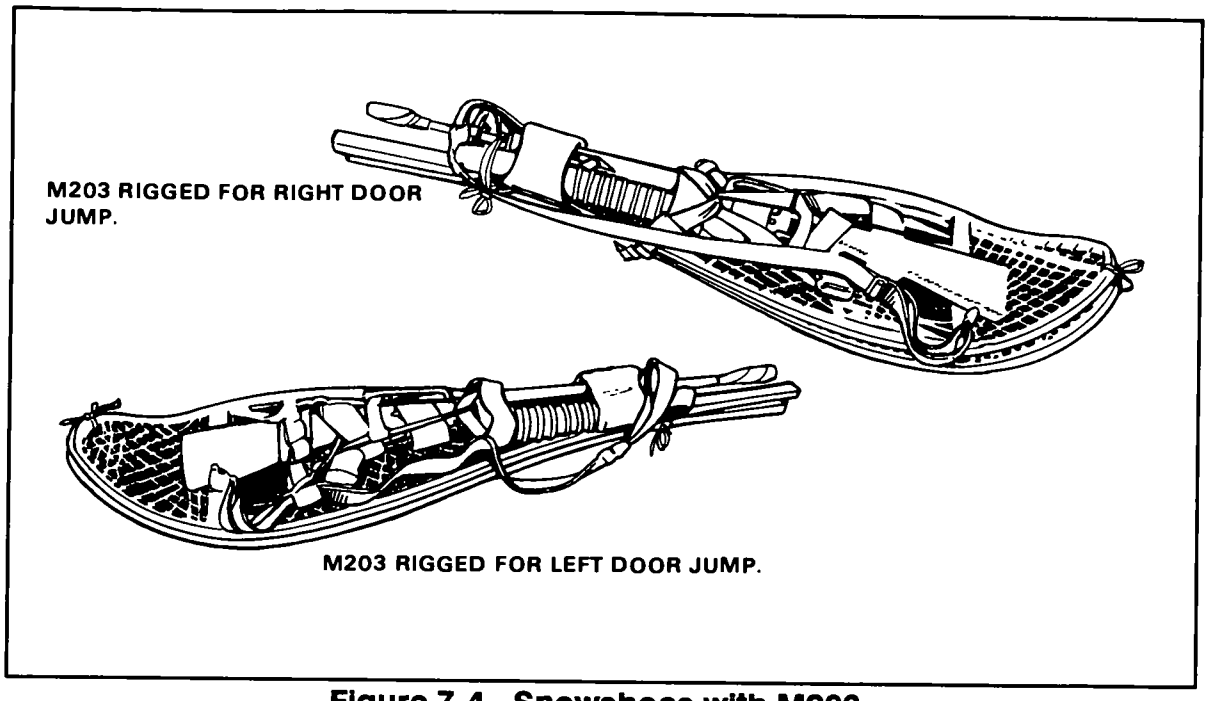


Figure 7-4. Snowshoes with M203.

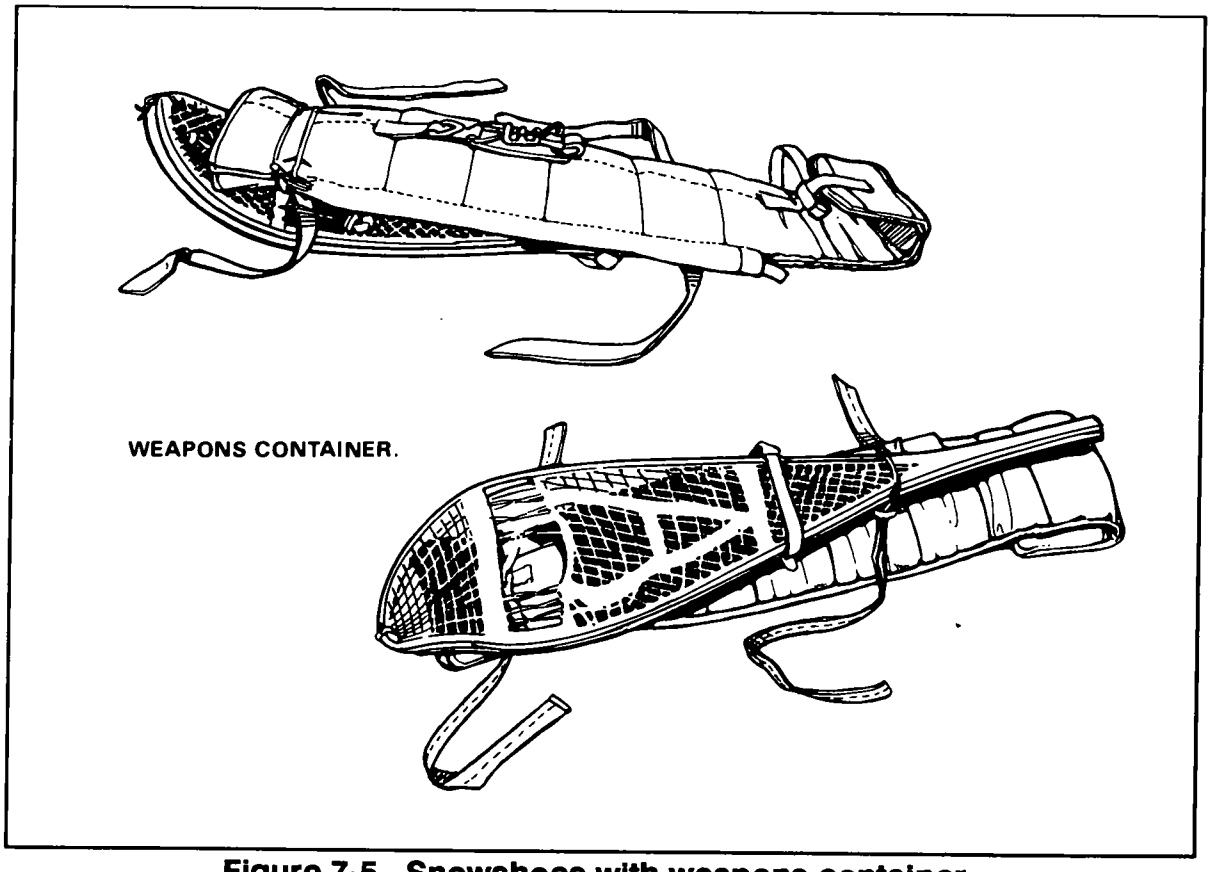


Figure 7-5. Snowshoes with weapons container.

Section III. TANDEM LOAD ON SINGLE LOWERING LINE

Tandem loads rigged on a single lowering line allow the individual parachutist to lower two items of equipment. This procedure reduces the time and tasks required to lower equipment and provides more time for canopy control and landing preparations.

7-6. RIGGED LOAD

The ALICE, or weapons container, is worn in the prescribed manner. The rifle sling is used to attach the snowshoes to the rifle. This load is suspended over the shoulder opposite the static line. The running end of the modified waistband extension is threaded through the waistband retainers of the reserve parachute and around the snowshoes, and the end is made into a quick-release fold (Figure 7-6).

NOTE: The rifle sling is adjusted to fit the parachutist snugly. The sling adjustment is also small enough so that it does not come off the load when released to slide down the lowering line.

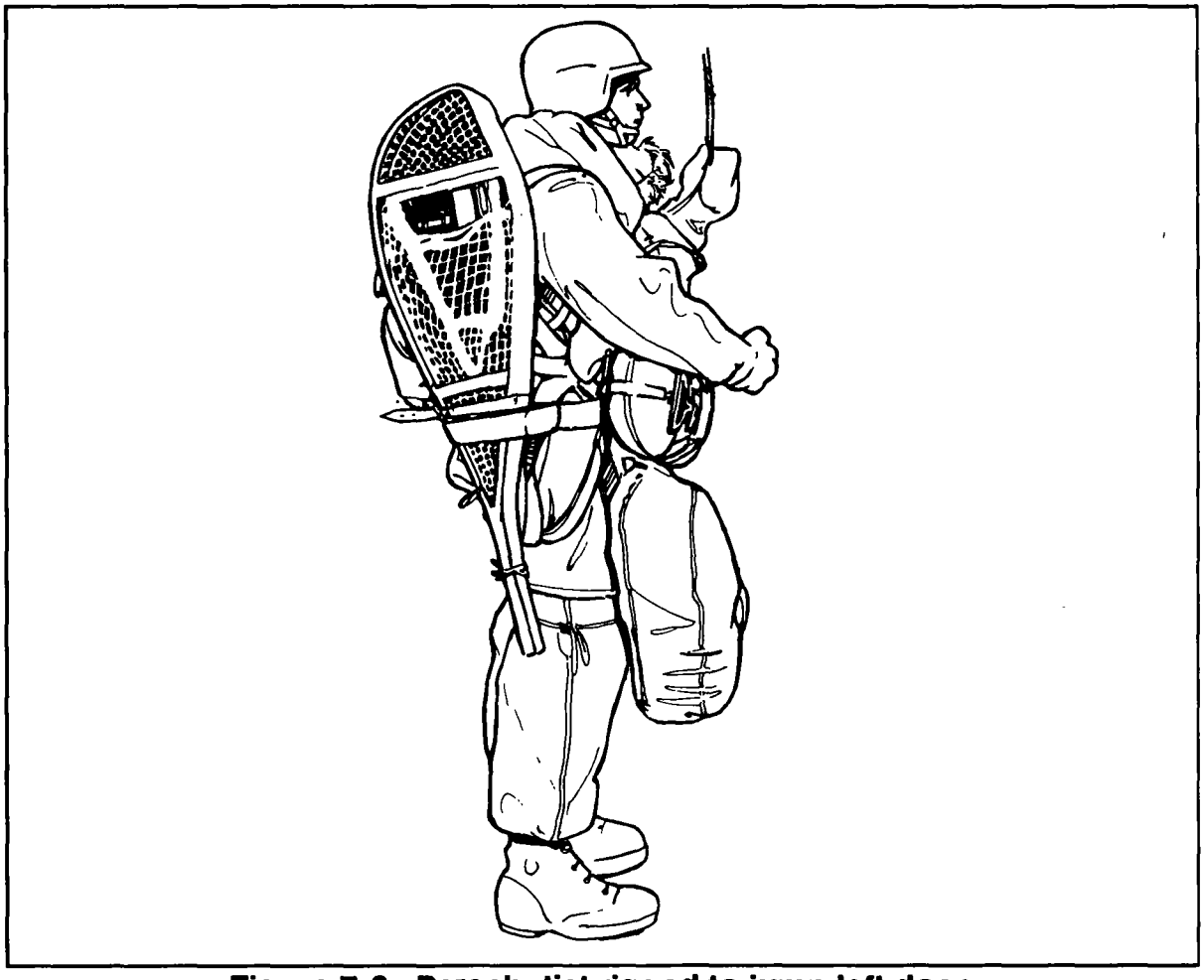


Figure 7-6. Parachutist rigged to jump left door.

7-7. HPT LOWERING LINE

The lowering line is threaded through the rifle sling and attached to the main lift web of the parachutist (on the side where the snowshoes are attached).

a. A length of 80-pound test tape is attached around the sling and the main lift web (just below the canopy release assembly) with a bowknot. The lowering line adapter web is attached (Figure 7-7) to the left (right) side (corresponding to the side to which the snowshoes and rifle are to be attached).

b. When jumping with the ALICE or weapons container, the lower tie-

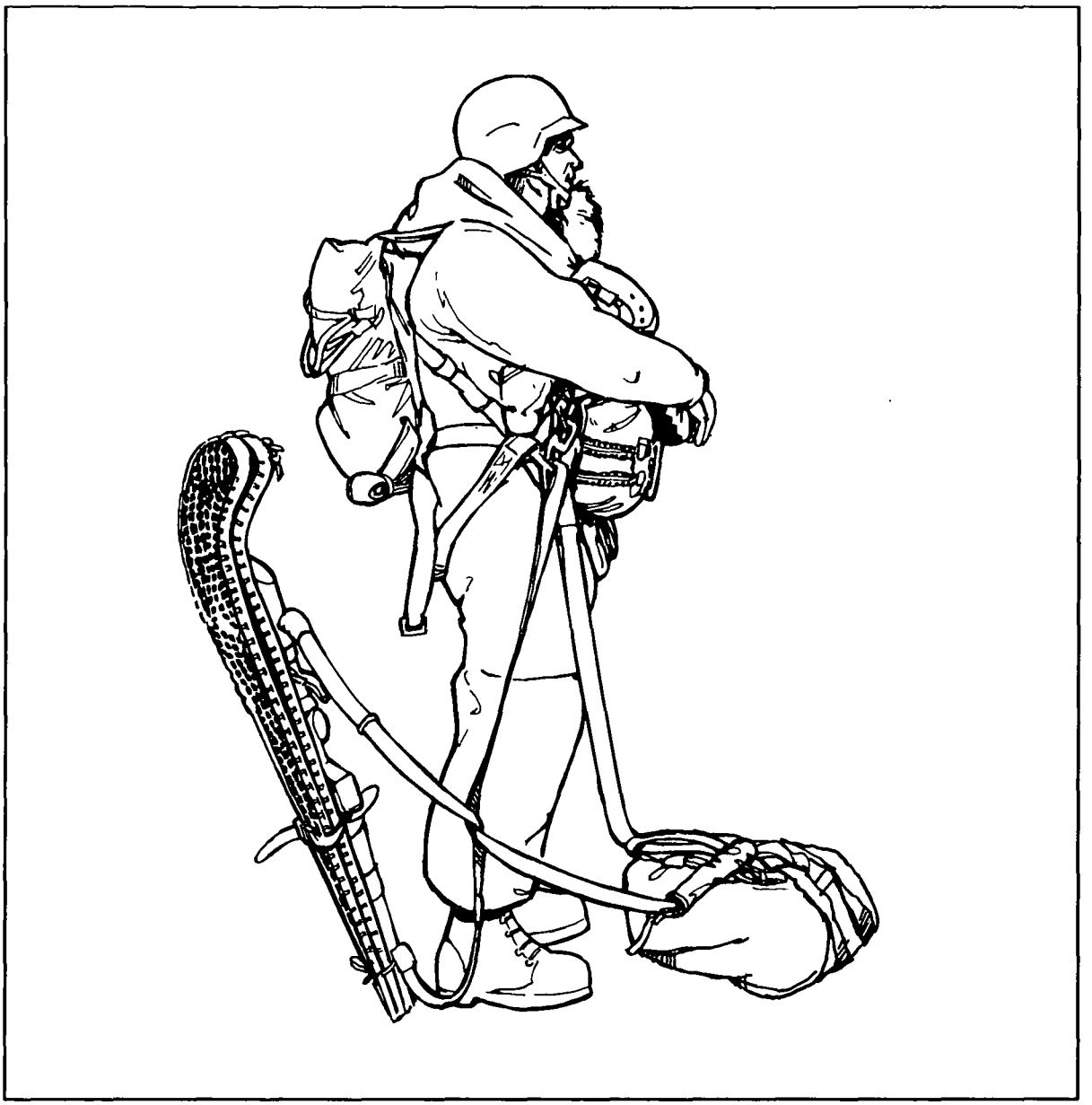


Figure 7-7. Lowering line assembly attached for a tandem load.

down on the case is routed through the metal frame and around the leg. A separate tie-down for each is not necessary (Figure 7-8).

c. The stowed lowering line is secured with two retainer bands to the left (right) side of the vertical bar of the combat pack. After the pack, snowshoes, and rifle are attached to the parachutist, the lowering line ejector snap is passed through the rifle sling and attached to the V-ring of the adapter web. If the adapter web is not used, the ejector snap is attached directly to the D-ring on the harness. If the weapons case is attached to the snowshoes (Figure 7-9), the lowering line ejector snap is passed between the case and the webbing of the case, which is attached to the case V-ring.

d. The upper bowknot (below canopy release assembly) and the lower tie-down around the parachutist's leg are untied, and the load is dropped by pulling the quick-release straps of the H-harness at the same time. This ensures that the pack load falls the length of the line. The modified waistband, quick-release fold is pulled and releases the snowshoes, which slide

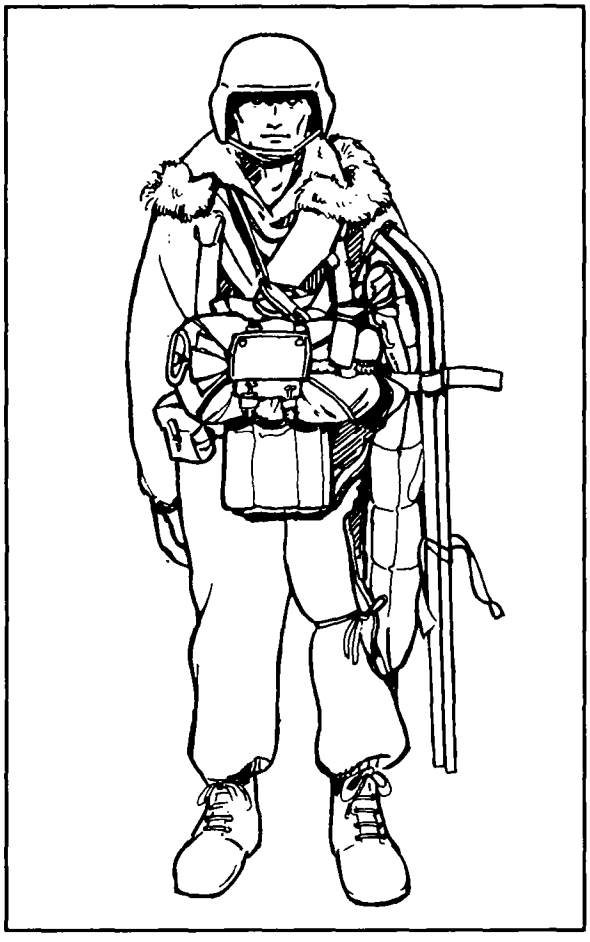


Figure 7-8. Upper and lower tie-downs.

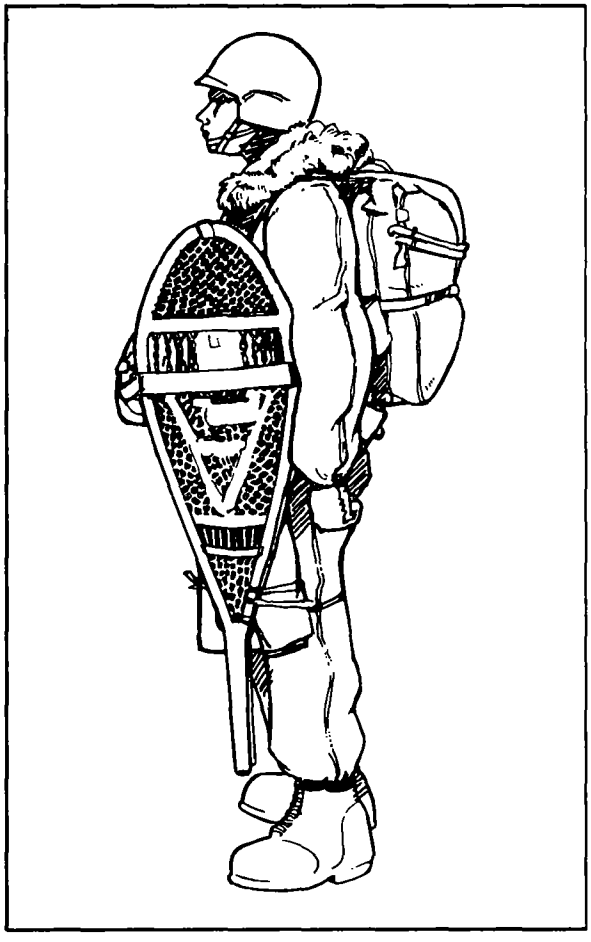


Figure 7-9. Left side view with weapon case.

down the lowering line on top of the pack (Figure 7-10).

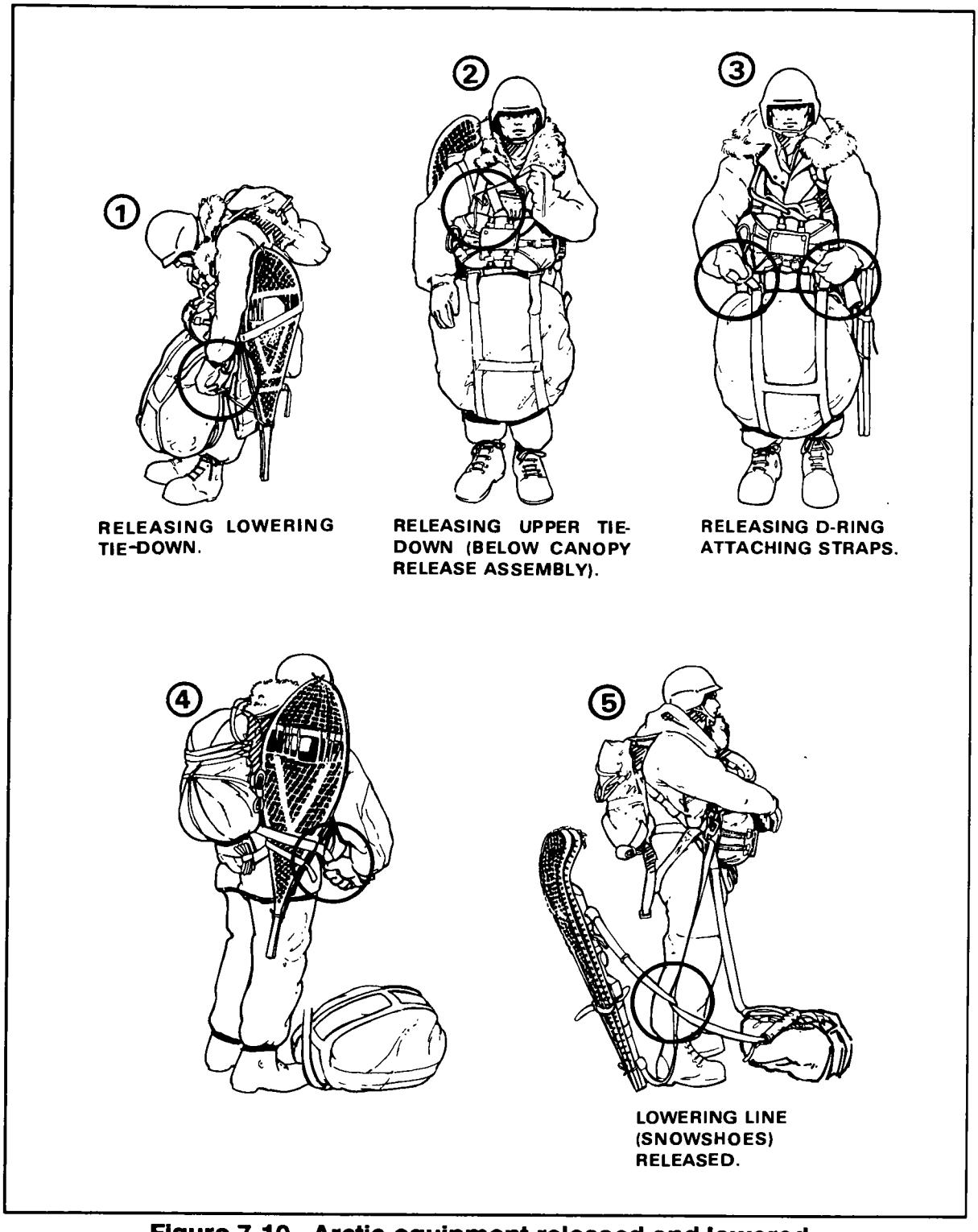


Figure 7-10. Arctic equipment released and lowered.

Section IV. SKIS JUMPED WITH RIFLE OR ALICE

Skis, with the rifle attached, can be jumped using the procedures outlined.

7-8. SKIS AND RIFLE

When the parachutist jumps with skis, or with skis as part of the individual jump load, the jump must be from a rear platform (Figure 7-11).

7-9. SKIS AND ALICE CONTAINER

The ALICE, or weapons container, lowering line is threaded between the skis and attached to the main lift web on the side to which the skis are attached. The lowering line is routed the same way, and the ejector snap hook is fastened to the V-ring on the adapter web or to the D-ring on the parachute harness (Figure 7-12). To secure and stabilize the skis, a length of 80-pound test tape is attached to the top and bottom of the skis with a bowknot. The skis and ALICE (or weapons container) are lowered by pulling the quick-release straps on the D-ring attaching straps at the same time. This drops the load down the length of the

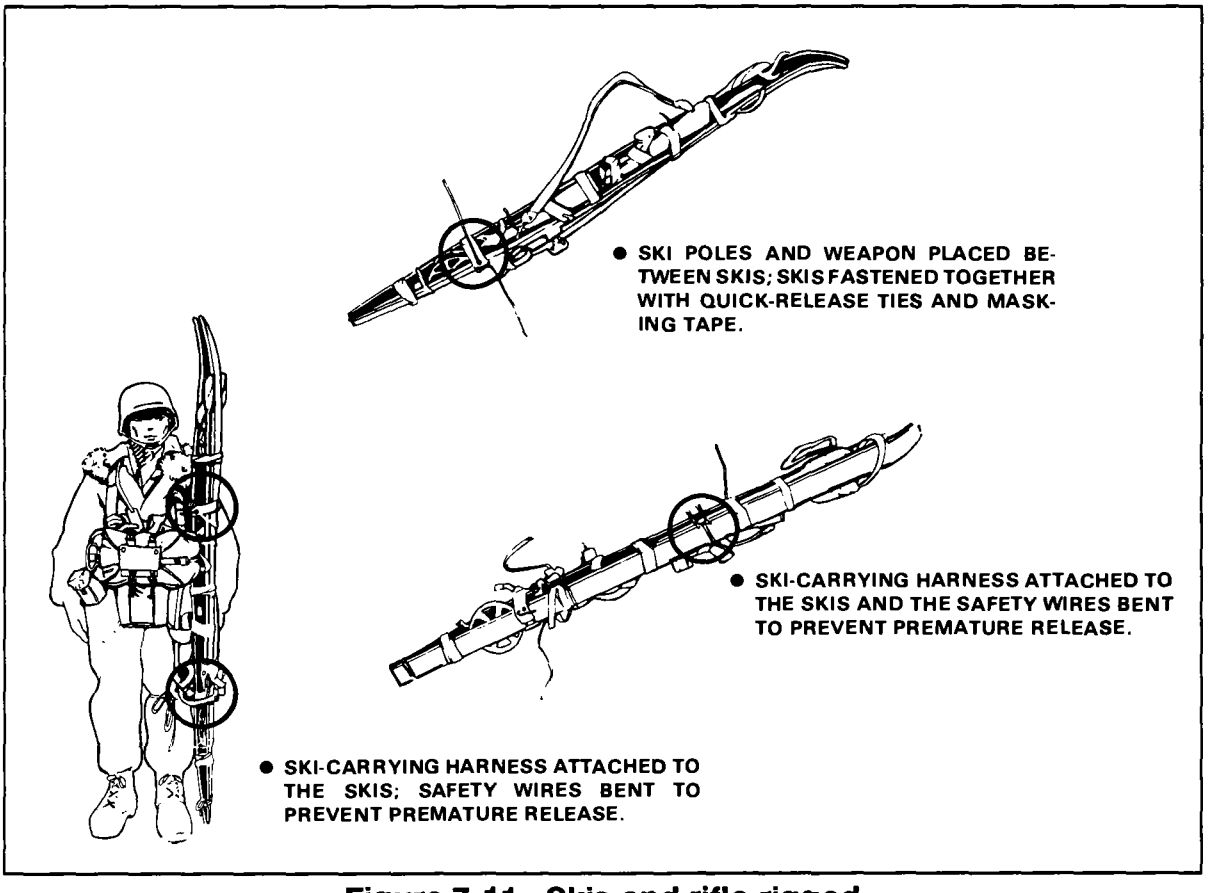

● SKI POLES AND WEAPON PLACED BETWEEN SKIS; SKIS FASTENED TOGETHER WITH QUICK-RELEASE TIES AND MASKING TAPE.
● SKI-CARRYING HARNESS ATTACHED TO THE SKIS AND THE SAFETY WIRES BENT TO PREVENT PREMATURE RELEASE.
● SKI-CARRYING HARNESS ATTACHED TO THE SKIS; SAFETY WIRES BENT TO PREVENT PREMATURE RELEASE.

Figure 7-11. Skis and rifle rigged.

lowering line. Pulling the quick-release fold of the A-7A strap and the locking-pincord lanyard of the ski-carrying harness releases and lowers the skis.

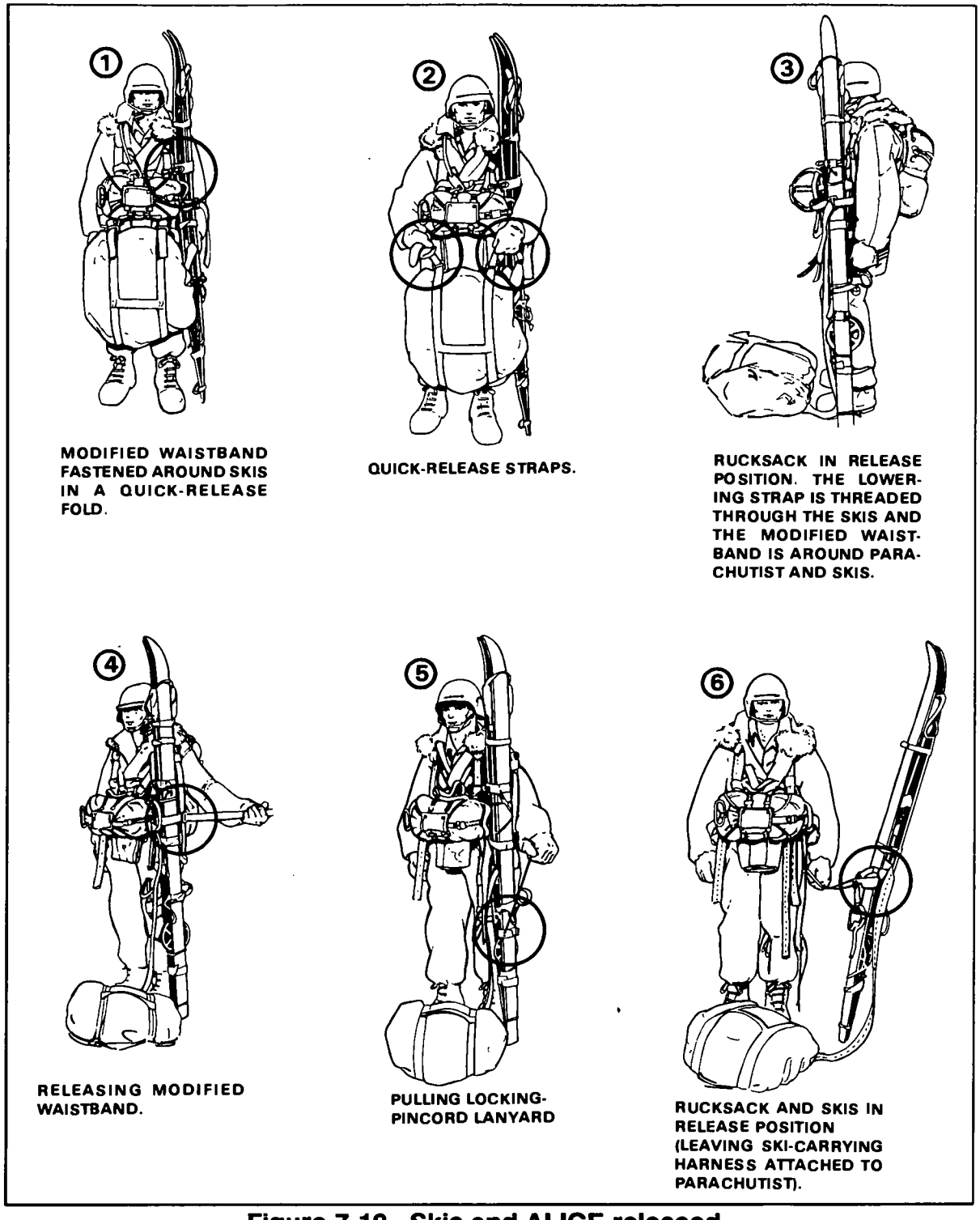

①
MODIFIED WAISTBAND FASTENED AROUND SKIS IN A QUICK-RELEASE FOLD.
②
QUICK-RELEASE STRAPS.
③
RUCKSACK IN RELEASE POSITION. THE LOWERING STRAP IS THREADED THROUGH THE SKIS AND THE MODIFIED WAISTBAND IS AROUND PARACHUTIST AND SKIS.
④
RELEASING MODIFIED WAISTBAND.
⑤
PULLING LOCKING-PINCORD LANYARD
⑥
RUCKSACK AND SKIS IN RELEASE POSITION (LEAVING SKI-CARRYING HARNESS ATTACHED TO PARACHUTIST).

Figure 7-12. Skis and ALICE released.

CHAPTER 8

A-SERIES CONTAINERS

Two types of A-series containers are used with rigging door bundles: the A-7A cargo sling and A-21 cargo bag. The containers can be rigged with a drogue or breakaway. For Army aircraft, a container load to be air-dropped from a shackle (wing load), helicopter door, or utility aircraft is rigged with a breakaway static line. For USAF aircraft, loads are rigged with parachutes that have nonbreakaway static lines. These static lines have a drogue device attached to the breakcord attaching loop (one for a C-130 and two for a C-141. Loads are dropped before parachutists. Loads followed immediately by parachutists are rigged with breakaway static lines, otherwise, they are rigged with nonbreakaway static lines.

Section I. RIGGING PROCEDURES

Door bundles are rigged so when placed on the balance point of the jump platform, the parachute is on top or facing the center of the aircraft, based on the largest dimension, and not on the side. The maximum weight of the bundle is 500 pounds (not including the weight of the parachute). Exceptions to this rigging technique are allowed for the 90-mm recoilless rifle and the Stinger missile. In both cases, the bundle is placed upright with the parachute facing the center of the aircraft. Both are rigged using the A-21 container. The skid board on the Stinger is placed inside the canvas cover.

8-1. ASSEMBLIES

When rigging components of an assembly, all items necessary for its operation must be packed in the same airdrop bundle. Items, such as a radio and battery, are packed in the same bundle. When items, such as radio equipment, are rigged, each item is individually wrapped. Padding or honeycomb is placed under the item being prepared and inserted between items (comprising the load) to prevent contact. Cellulose wadding, felt, or other suitable material must be used to avoid metal-to-metal or metal-to-wood contact.

8-2. WEBBING

All excess lengths of webbing are rolled, tied with 1/4-inch cotton webbing in a bowknot, and taped. This reduces the danger of bundles becoming snagged as they are ejected or released from the aircraft.

8-3. HAZARDOUS MATERIALS

If hazardous materials are placed inside bundles, they must have a DD Form 1387-2 completed IAW AFR 71-4/TM 38-250.

NOTE: The copy of the DD Form 1387-2 is attached to the manifest, not the bundle.

Section II. A-7A CARGO SLING

The A-7A consists of the following components:

- **Four straps, 188 inches in length, constructed of Type X cotton or Type VII nylon.**
- **One end of each strap contains a strap fastener (friction adapter).**
- **Four D-rings.**

8-4. CHARACTERISTICS

Container components weigh 8 pounds with a maximum weight of 500 pounds (not including the parachute). (The minimum weight depends on the parachute used.) The dimensions are a maximum 30 inches wide by 48 inches deep by 66 inches high (to include cargo parachute).

8-5. TWO-STRAP BUNDLE

Lay out one strap perpendicular (length) to the bundle with the large lip portion of the friction bar on the friction adapters and facing down. Lay out one strap parallel (width) to the bundle with the large lip portion of the friction bar on the friction adapters facing down and over the top of the perpendicular strap. When the straps are in place, they are ready to receive the bundle.

a. Center the bundle on the perpendicular strap. Route the perpendicular strap over the top of the bundle and through the single D-ring (through the rectangular portion of the D-ring), fold, and secure.

b. Route the parallel strap through the D-ring (through the rectangular portion of the D-ring), roll, and secure. Tie and tape all excess webbing to itself.

c. Tighten all straps and tape excess. Ensure that the excess is tied off above the friction adapter, and that the excess webbing is not above the top of the bundle. The bundle has one smooth side for ease in ejecting from the aircraft.

8-6. THREE-STRAP BUNDLE

Lay out one strap perpendicular (lengthwise) to the bundle. Lay out two straps parallel to each other on top of the perpendicular strap (ensure friction adapters are on the same side), at least 14 inches from each other, and centered.

a. Center the bundle on the perpendicular strap. Route the perpendicular strap over the top of the bundle and through the two D-rings, fold, and secure. Route the parallel strap through the D-rings from the inside toward the outside so that the D-rings are pointing to each other, fold, and secure. Tie and tape all excess webbing to itself.

b. Tighten all straps, and tape excess. Ensure that the excess is tied off above the friction adapter, and that the excess webbing is not above the top of the bundle. The bundle has one smooth side for ease in ejecting from the aircraft.

8-7. FOUR-STRAP BUNDLE

Lay out two straps perpendicular to the bundle and centered. Lay out two straps parallel to each other on top of the perpendicular strap and centered. Center the bundle on the perpendicular straps.

a. Route the perpendicular straps through the two D-rings (one D-ring per strap), fold, and secure. Route the parallel straps through the D-rings (ensuring that both D-rings point in the same direction), fold, and secure (one D-ring for each strap). Ensure that the friction adapters are on the same side. Tie and tape all excess webbing to itself.

b. Tighten all straps, and tape excess. Ensure that the excess is tied off above the friction adapter, and that the excess webbing is not above the top of the bundle. The bundle has one smooth side for ease in ejecting from the aircraft.

Section III. A-21 CARGO BAG

The A-21 cargo bag consists of the following components:

- **Canvas cover. Cotton duck material with eight strap keepers, with dimensions of 97 inches by 115 inches.**
- **Sling assembly with scuff pad. One 188-inch main strap; two 144-inch side straps; scuff pad 30 inches by 60 inches; four lifting handles.**
- **Quick-release assembly. Quick-release device with safety clip; three quick-release straps; one fixed quick-release strap.**
- **Two-ring straps. The ring strap has one 9-inch strap that has a**

friction adapter; one 7-inch strap with a D-ring.

8-8. CHARACTERISTICS

Container components weigh 18 pounds with a maximum weight of 500 pounds (not including the parachute). (The minimum weight depends on the parachute.) Dimensions are a maximum 30 inches wide by 48 inches deep by 66 inches high (69 inches high for the Stinger missile, FM 10-550).

8-9. METHOD OF RIGGING

Spread the canvas cover on a level surface with all strap keepers facing up. Position the sling assembly, webbing straps down on the canvas cover and thread the straps through the keepers. Turn the sling and canvas cover over as a unit so the sling is beneath the cover. Center the load on the canvas cover. Use cushioning material, as necessary. Wrap the load in the canvas cover, side flap first; fold all excess material under.

a. Attach the two-ring straps to the 188-inch main strap, keeping the D-ring-to-D-ring contact, and ensuring they are centered. Attach the four quick-release straps to the 144-inch side straps. Ensure that the rotating disk is facing up when the quick-release assembly is placed on top of the load (thick-lip portion of the friction bar facing out).

b. Thread the fixed, quick-release strap with the quick- release assembly attached through the nearest steel rod ring. Thread the remaining quick-release straps through the nearest steel rod rings. Insert the lugs into the quick-release assembly.

c. Tighten the quick-release straps and the two ring straps; fold and tape all excess webbing. Ensure that it is tied off below the friction adapter, and that the quick-release device is centered on the bundle.

Section IV. CARGO PARACHUTES

After the A-series containers are rigged, the cargo parachutes are inspected and attached to the load.

8-10. INSPECTION

The cargo parachute is placed on the center of the bundle and is inspected for—

- Four tie-down straps.
- Two risers complete (clevis, clevis pin, safety wire).
- Static line complete with drogue device (clevis, clevis pin, safety wire). The drogue device must be attached to the breakcord attach-

ing loop, unless a breakaway static line is used.

8-11. ATTACHMENT

Ensure that the risers go directly to the attaching point (D-ring), tie-downs are attached (tied to side straps), static line is free to deploy, and risers are not routed around or under any part of the bundle.

NOTE: Cargo parachute should be attached with the side of the pack where the risers come out, collocated to the rough side of the bundle.

CHAPTER 9

PERSONNEL PARACHUTES

Two types of parachutes are used in conventional static line airborne operations: the T-10C nonsteerable canopy and the MC1-1B/C steerable canopy, which have been modified several times. The MC1-1C steerable is the Standard A canopy and replaces the MC1-1B through normal attrition. The main parachutes are static-line deployed and consist of five major components: the harness assembly, riser assembly, deployment bag and static line assembly, pack tray assembly, and canopy assembly. The 24-foot diameter troop chest reserve is used with both main parachutes. The complete parachute assembly (main and reserve) weighs about 38 pounds.

9-1. HARNESS ASSEMBLIES

Two harness assemblies are used with the canopies described above: the T-10 and T-10 modified with triangle links. The T-10 with triangle link is the Standard A harness and replaces the T-10 through normal attrition (Figure 9-1).

a. The harness assembly is made of a flexible framework of Type XIII nylon webbing. The components attached to it are as follows.

(1) Female portion of the cable loop-type canopy release assembly with a tensile strength of 5,000 pounds (with safety clip, cable loop, and latch).

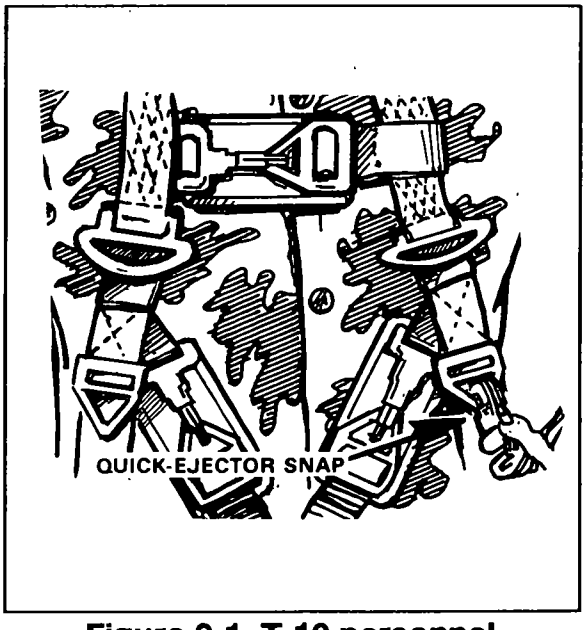


Figure 9-1. T-10 personnel parachute harness with triangle links.

(2) Canopy release pads permanently attached behind the cable loop-type canopy release assembly.

(3) Main lift web constructed of Type XIII nylon with a tensile strength of 6,500 pounds.

(4) Chest strap with a quick-ejector snap with locking lever, spring-loaded ball detent, and guard with a tensile strength of 2,500 pounds.

(a) Ejector snap pad is attached behind the quick-ejector snap.

(b) Quick-fit V-ring has a tensile strength of 2,500 pounds.

(c) Webbing retainer is used for stowing excess webbing.

(5) D-rings used for attaching the T-10 reserve and additional combat equipment with a tensile strength of 5,000 pounds.

(6) Triangle links sewn into the main lift web of the new harness about 5 1/2 inches below the D-rings for attaching equipment and lowering lines.

(7) Leg straps with a quick-ejector snap with locking lever, spring-loaded ball detent, and guard with a tensile strength of 2,500 pounds.

(a) Ejector snap pad is attached behind the quick-ejector snap.

(b) Quick-fit V-ring has a tensile strength of 2,500 pounds.

(c) Webbing retainer is used for stowing excess webbing.

(8) Saddle composed of Type XIII nylon with two leg straps attached.

(9) Diagonal backstraps in six sizing channels (S, 1, 2, 3, 4, L).

(10) Backstrap adjusters with free-running ends of the horizontal backstrap attached, which are rolled and sewn so they cannot be dislodged.

b. The harness assembly has five points of adjustment: the chest strap, two leg straps, and two free running ends of the horizontal backstrap, which are the two main points of adjustments.

9-2. RISER ASSEMBLY

a. The riser assembly on the T-10C consists of the following:

- Two riser assemblies. They measure 60 inches long of Type XIII nylon with a tensile strength of 6,500 pounds. A male fitting is permanently attached to the center of the webbing. When attached to the canopy, it provides four individual risers.
- Log record pocket.
- Connector link loops.
- L-bar connector links.

b. The riser assembly on the MC1-1B/C is identical except for containing—

- Guide ring retainer strap.
- Guide ring.
- Control line channels (upper and lower).

9-3. DEPLOYMENT BAG AND STATIC LINE ASSEMBLY

a. The D-bag is constructed of 8.8-ounce cotton sateen cloth with dimensions of 18 by 12 by 5 inches. It consists of the following:

- Suspension line protector cover with data block.
- Suspension line protector cover tie loop.
- Stow loop panel (used to retain the suspension line).
- Locking stow loops (two, which keep the D-bag closed until the first two stows are pulled free).
- Connector link tie loops (four).
- Side flaps (two).
- Break cord attaching strap.
- Break cord attaching strap pocket.
- Locking stow panel.
- Locking stow loop hood.

b. The static line is permanently attached to the D-bag. It is 15 feet in length, Type VIII nylon, with a tensile strength of 3,600 pounds. It consists of the following:

- Static line sleeve.
- Static line pack opening loop.
- Static line snap hook safety wire and lanyard.
- Static line snap hook with locking button and sliding sleeve.

9-4. PACK TRAY ASSEMBLY

The pack tray is constructed of 7.25-ounce nylon duck material with dimensions of 20 by 14 by 5 inches. It consists of the following:

- Pack closing flaps (four): right and left side flaps, and upper and lower end flaps.
- Pack closing loops (four): right and left side flap closing loops, and upper and lower end flap closing loops.
- Retainer band keepers.
- Static line slack retainer.
- Waistband adjuster panel.
- Metal adapter.
- Waistband (46 inches in length).
- Pack closing tie (tied in a surgeon's knot and a locking knot; the knot is between 3 and 6 o'clock positions).

- Diagonal backstrap retainer.
- Diagonal backstrap keeper.
- Horizontal backstrap retainer.
- Horizontal backstrap keeper.

9-5. CANOPY ASSEMBLY

The T-10C and MC1-1B/C parachutes are static line deployed. When the parachutist falls to the end of the 15-foot static line, body weight breaks the 1/4-inch webbing (pack closing tie), allowing the deployment bag to be pulled from the pack tray. Two connector link ties break, and the suspension lines are pulled out of the stow loops of the deployment bag. Then, two locking stows disengage, and the canopy is pulled (from the deployment bag) to its full length. The break cord tie (which secures the apex of the canopy to the break cord attaching strap loop) breaks, and the parachute begins to inflate, retarding the parachutist's rate of descent. The break cord tie is constructed of 1.1 ounce ripstop nylon parachute cloth (weight 1.1 ounce per square yard).

a. A description of the canopy assemblies is as follows:

(1) Parabolic in shape.

(2) The average rate of descent for both "C" canopies is about 15 feet per second, depending on total weight.

(3) Canopy weight is between 28 and 31 pounds.

(4) Nominal diameter is 35 feet, measured 3 feet up from the skirt and 24.5 feet at the skirt.

(5) Shelf life and service life (combined) is 16.5 years; service life is 12 years and shelf life is 4.5 years.

(6) Repacked every 120 days.

(7) Suitable for airdrop of personnel onto DZs with ground elevation up to 10,000 feet.

b. The MC1-1B has an estimated 18 feet per second descent rate and an 8.8-second turn rate.

(1) Bridle loop is 3 inches in diameter, made of Type VIII nylon with a tensile strength of 3,600 pounds.

(2) Apex vent lines (15) are 19 inches in length of Type II nylon cord with a tensile strength of 400 pounds. The apex vent lines with centering lines keep the bridle loop in place and the canopy even during deployment.

(3) Apex vent cap has a 3-inch diameter opening, which reduces oscillation and assists in a positive opening of the canopy.

(4) Upper lateral band is 1-inch tubular nylon with a tensile strength of 4,000 pounds. It is sewn in as reinforcement since the first 64 inches of the canopy is a high-pressure area.

(5) Gores (30) with five sections per gore: each gore is numbered 1 through 30; each section is sewn diagonally to prevent rips and holes from spreading throughout the canopy.

(6) Radial seams (30) are 9/16 inch wide and 17 feet, 2 7/32 inches long, measured from the upper lateral band to the lower lateral band.

(7) T-U (shaped) configuration has sections from the rear (11 gores; 25 to 5) removed (100.4 square feet of canopy), which enables the canopy to turn 360 degrees in 8.8 seconds and gives a forward thrust of 8 knots, or 14 feet per second.

(8) Two control lines are 28 feet in length and are attached to a control bridle that in turn is attached to radial seams 5 and 6. They are 6 feet long and attached to seams 25 and 26. They run down and out to the front of the rear set of risers and through the control line channel and control line guide ring. They are attached to a toggle that is 5/8 inch in diameter and made of hardwood dowel.

(9) Lower lateral band is a 1-inch nylon tape with a tensile strength of 525 pounds.

(10) Pocket bands (15) ensure positive opening of the canopy.

(11) V-tabs (30) are 9/16 inch wide and are sewn over the suspension line to the lower lateral band for reinforcement.

(12) Suspension lines (30) are Type II nylon with a tensile strength of 375 pounds. They are 25 feet, 6 inches long when measured from the lower lateral band to the L-bar connector link.

(13) Anti-inversion net is sewn 18 inches down on each suspension line and is made of 3 3/4-inch square mesh, knotless, braided nylon.

c. The MC1-1C (Figure 9-2, page 9-6) canopy is the same basic design as the MC1-1B with the exception of the following:

(1) An estimated ~~15 feet per~~ second descent rate and a 7.7-second turn rate.

(2) No porosity (NOPO) material (0-3 CFM).

(3) Vent cap is removed.

(4) Suspension lines are shortened to 22 feet.

(5) Cording of the suspension lines are 8 on the front risers and 7 on the rear.

(6) H-TC modification—60-foot square orifice.

d. The T-10C canopy consists of the following:

(1) Bridle loop is 3 inches in diameter, made of Type VIII cotton

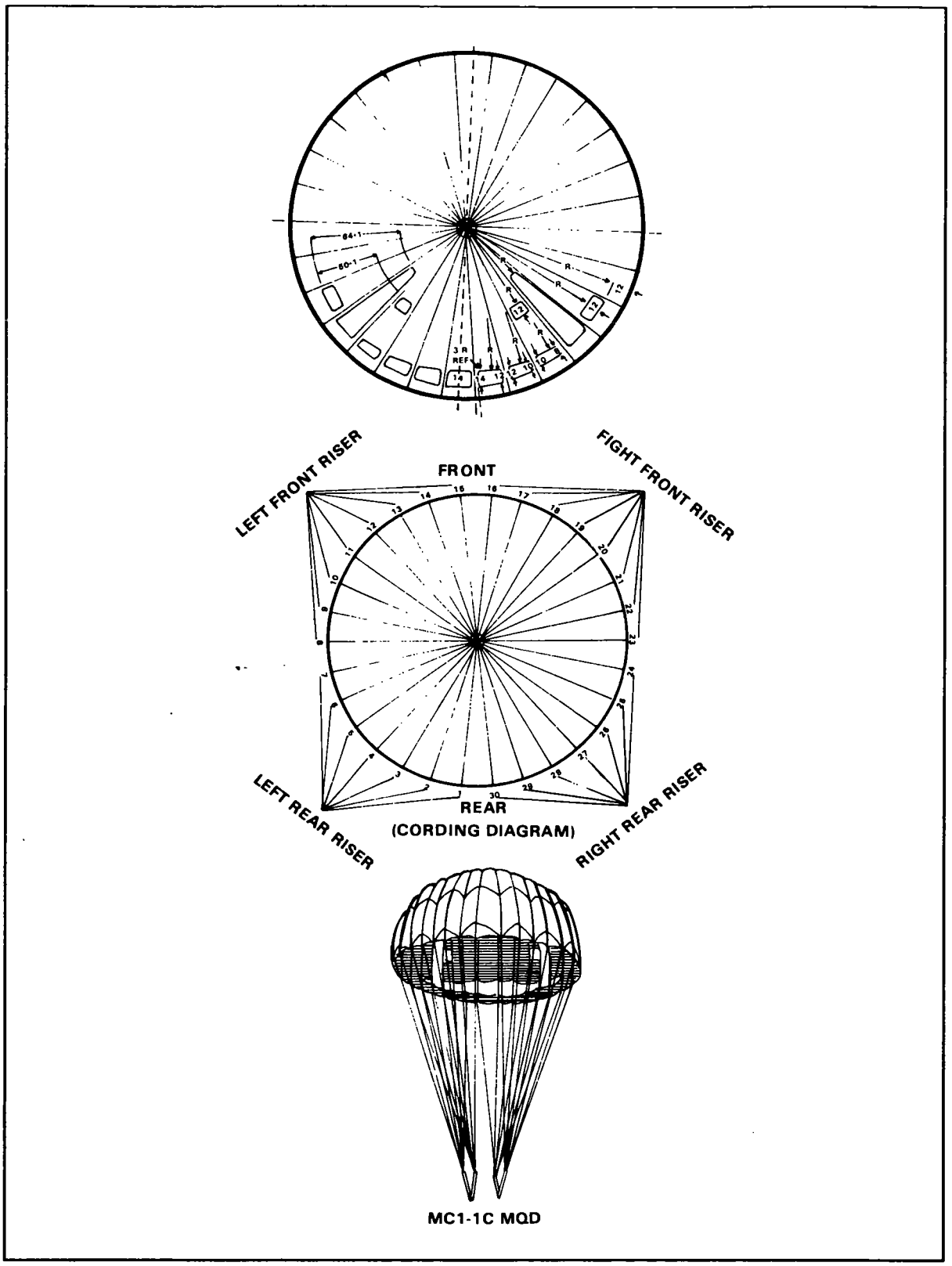


Figure 9-2. NOPO MC1-1C canopy.

or nylon, and has a tensile strength of 2,900 pounds.

(2) Apex vent lines (15) are 19 inches long, Type II nylon cord, with a tensile strength of 375 pounds.

(3) Apex centering loops (2) are 9 inches long, made of Type II nylon cord, with a tensile strength of 375 pounds.

(4) Apex vent is 20 inches in diameter and, when the canopy is inflated, the vent expands to 22 inches in diameter.

(5) Upper lateral band is 1-inch tubular nylon with a tensile strength of 4,000 pounds.

(6) Gores (30) consist of five section for each gore.

(7) Radial seams (30) are 9/16 inch wide and 17 feet, 2 7/32 inches long.

(8) Lower lateral band is made of 1-inch nylon tape with a tensile strength of 525 pounds.

(9) Pocket positive opening bands (15) have been lengthened to 11 3/4 inches to provide a more positive opening and a 4.37-foot (overall) increase in the canopy to reduce descent about 15 feet per second.

(10) V-tabs (30) are 9/16 inch wide.

(11) Suspension lines (30) that are 25 feet, 6 inches long.

(12) Anti-inversion net is sewn 18 inches down on each suspension line and is made of 3 3/4-inch-square mesh, knotless, braided nylon.

9-6. TROOP CHEST (24-FOOT DIAMETER) RESERVE PARACHUTE

The reserve parachute (used with T-10C and MC1-1B/C) is loaf-shaped, chest-mounted, and manually operated. It weighs about 12 pounds, has a shelf-life and service life not to exceed 15 years (1.5 years shelf life, 13.5 years service life). It is repacked every 365 days. It is an emergency-type parachute designed to be activated by the parachutist if the main parachute malfunctions. The reserve parachute consists of four major components: a pilot parachute assembly, canopy assembly, pack tray assembly, and rip cord assembly.

a. **Pilot Parachute Assembly.** The pilot parachute acts as an air anchor to assist the canopy to deploy quickly. It is spring-activated and is made of 1.1-ounce ripstop nylon parachute cloth (40 inches in diameter). It is described as follows:

(1) Octagon-shaped, with reinforcements on the inside of the canopy.

(2) Pockets (4) to stow the framework of the spring on the inside of the canopy, and is sewn down.

(3) Suspension lines (8) of Type I nylon cord. Each pair of suspension lines is formed by one continuous line that runs through the canopy and is stitched together at the lowest point to form the connector loop. The connector loop is used to attach the pilot parachute to the apex of the reserve by means of a bridle line that is 15 inches long and made of Type III nylon cord, with a tensile strength of 550 pounds.

b. **Canopy Assembly.** The canopy assembly is a 24-foot, flat, circular parachute constructed of 1.1-ounce ripstop nylon parachute cloth. It is described as follows:

(1) The rate of descent is about 15 to 22 feet per second.

(2) An apex vent, 20 inches in diameter.

(3) Suspension lines (12) 57 feet 6 inches long, made of Type III nylon cord, with a tensile strength of 550 pounds, measured from connector snap to connector snap. On this parachute, the suspension lines serve three purposes:

(a) From the connector snaps that double as connector links, the lines are suspension lines, 20 feet in length.

(b) Where the lines go through the radial seams of the canopy, the lines become canopy lines.

(c) Across the apex vent, the lines are apex vent lines until the point they again go into the radial seam.

(4) An upper lateral band of 1-inch tubular nylon, with a tensile strength of 4,000 pounds.

(5) A lower lateral band of 1-inch nylon tape, with a tensile strength of 525 pounds.

(6) Gores (24) with sections (4) for each gore.

(7) A 9/16-inch nylon V-tab reinforcement sewn into the lower lateral band of the parachute and wrapped around each suspension line.

(8) Pocket bands (24).

(9) A canopy that comes in two colors: white and olive drab. The pack tray, when constructed of nylon sateen, indicates that the canopy is OD or sage green in color.

NOTE: Inside the tray pack is a 10-inch spreader bar. If one connector snap of the reserve becomes dis-connected from one of the harness D-rings, the spreader bar keeps that connector snap attached to the other snap, which is still connected to the parachute harness. This enables the reserve to be deployed if a malfunction occurs.

c. **Pack Tray Assembly.** The pack tray is constructed of 12.29-ounce cotton duck or 7.25-ounce nylon on a rigid frame used to contain the parachute

until activation. It is described as as follows:

(1) Carrying handles (top and left side).

(2) Safety wire and lanyard.

(3) Pack closing flaps (right end flap, left end flap, top side flap, and bottom side flap).

(4) Pack opening spring bands (3) with running ends (6) connected to dressmaker's eyelets (6).

(5) Rip cord grip stow pocket sewn to the right closing flap.

(6) Rip cord protector flap with logbook stow pocket on the inside of the flap.

(7) Pack fasteners that are sewn to the left and right closing flaps.

(8) Grommets and cones that keep the pack closed by inserting the locking pins of the rip cord through the cones. (Grommets are on the top flap and the cones are on the bottom flap.)

(9) Connector snaps (2) for attachment to the harness D-rings.

(10) Cotton or nylon waistband retainers (2) consist of a single piece of material sewn into the pack tray.

d. **Rip Cord Assembly.** The rip cord grip is used to activate the reserve if an emergency or malfunction occurs. It is described as follows:

(1) A cloverleaf-shaped, cadmium-plated, steel rip cord grip.

(2) A 7-inch, flexible steel cable connected by means of a steel swedge ball. It has two locking pins, 1 1/4 inches long, permanently affixed to the flexible cable. It takes about 27 pounds of pull pressure the activate the reserve parachute.

PART THREE

AIRCRAFT USED IN AIRBORNE OPERATIONS

CHAPTER 10

AIRCRAFT AND JUMP ALTITUDES

This chapter contains general aircraft descriptions, jumpmaster procedures, and aircraft preparations. Critical elements of airborne operations are the aircraft and drop altitudes. These aircraft are service tested and approved for troop jumping. Minimum jump altitudes and considerations that apply to basic airborne jumps, tactical jumps, and combat jumps are discussed.

10-1. TYPES OF AIRCRAFT

Types of aircraft used for airborne operations are:

a. The C-130 and C-141B are commonly used USAF aircraft for troop airdrop. Jump procedure are available from the proponent for the SA-16, C-47, C-46, C-119, C-124, C-123, C-5, C-123, and C-7A.

b. The UH-1 series, UH-60, CH-47, CH-54, CH-53 (USMC), and CH-46 (USMC) are the most commonly used rotary-wing aircraft for troop airdrop. Jump procedures are available from the proponent for the UH-19, CH-21, CH-34, CH-37, C-45, U-21, and U-1.

10-2. JUMP ALTITUDES

The minimum criteria discussed below include a 125-foot alti-meter error (aircraft) and a 100-foot canopy control for the MC1-1B/C.

a. Minimum jump altitudes for all aircraft are:

(1) Tactical (peacetime training):

- Basic airborne training – 1,250 feet AGL.
- Tactical training – 800 feet AGL.
- Aircraft with a drop speed of less than 90 knots – 1,500 feet AGL.

(2) Combat (wartime): (Restricted to aircraft with a drop speed of 90 knots or higher.)

- T-10C parachute—435 feet AGL.
- MC1-1B/C parachute—475 feet AGL.
- Minimum airspeed of 125 knots.
- Reserve parachute (optional).

b. Sustained prejump training is modified to ensure that the individual parachutist accomplishes the following tasks.

(1) Upon receiving the opening shock of the main, immediately lowers individual equipment.

(2) Assumes the landing attitude (T-10C) or canopy control (MC1-1B/C).

c. Table 10-1 summarizes data at varying altitudes with personnel parachutes (mains only—not reserves).

10-3. HIGH-ELEVATION JUMPING

High-elevation jumping pertains to a unit jumping at normal altitude above ground level but 5,000 to 10,000 feet above sea

	T-10C PARACHUTE		MC1-1B/C PARACHUTE	
ALTITUDE IN FEET (ABOVE GROUND LEVEL).	PERCENTAGE OF CANOPIES THAT WOULD BE OPEN.	PERCENTAGE OF PARACHUTISTS WHO WOULD HAVE 100 FEET OR MORE TO PREPARE TO LAND.	PERCENTAGE OF CANOPIES THAT WOULD BE OPEN, AND THE PARACHUTIST WOULD HAVE CANOPY CONTROL (NO TWIST).	PERCENTAGE OF PARACHUTISTS WHO WOULD HAVE CANOPY CONTROL PLUS 100 FEET OR MORE TO LAND.
200	76.11	4.00	13.00	NONE
300	99.92	76.11	90.66	13.00
400	99.98	99.92	99.98	90.66
500	99.98	99.98	99.98	99.98
600	99.98	99.98	99.98	99.98
700	99.98	99.98	99.98	99.98
800	99.98	99.98	99.98	99.98

Table 10-1. Data at varying altitudes.

level – for example, in mountainous terrain.

a. **Parachutes.** Standard troop-type parachutes are suitable for the airdrop of personnel onto DZs with ground elevations up to 10,000 feet. Current jump procedures are valid.

b. **Injuries.** Combat or field maneuvers and training exercises at DZ elevations of 5,000 to 10,000 feet, which place safety secondary to tactical considerations, can produce injury rates of up to four times those expected for similar DZ operations near sea level. Injury rates can be reduced by intensive indoctrination, training, and practice to include:

(1) Exiting body position and PLF position upon ground impact.

(2) Increasing opening shocks and rates of descent.

(3) Preparing to control the parachute during sudden wind shifts and changes in wind velocity.

(4) Wearing equipment correctly and ensuring service ability.

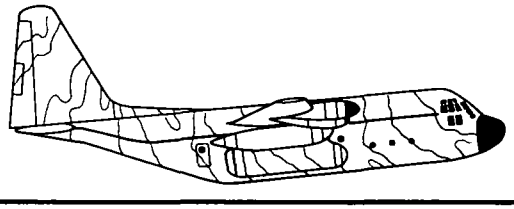
USAF TRANSPORT AIRCRAFT (MAC)

USAF transport aircraft are configured to meet the needs of the unit mission request. These configurations are commonly known in the MAC 55-series regulations as tactical airdrop personnel (TAP) for the C-130 and airdrop personnel (ADP) for the C-141. The initial request from the airborne unit dictates how the aircraft will be configured to accomplish the mission.

- **Tactical mass airdrop (both jump doors)—full seating configuration.**
- **In-flight rigging— tactical mass airdrop (both doors) — full seating configuration; comfort pallet with/without letters.**
- **Other load considerations—combination of air-land and airdrop mission; single door—reduced seating configurations.**
- **Over-the-ramp— combination equipment and personnel.**

Section I. C-130 HERCULES

The C-130 (Figure 11-1) is a medium-range, high-wing transport aircraft powered by four turboprop engines. Parachutists may be dropped using either the two jump doors or the ramp.



CONFIGURATION	PARACHUTIST LOAD
TAP 1 - Mass Drop	64
TAP 2 - In-Flight Rig	44
TAP 3 - HALO Ramp Operations and Wedge	42
TAP 6 - Arctic Operations 40	40

Figure 11-1. C-130 Hercules.

11-1. SEATING CONFIGURATION

The seating configuration for the C-130 Hercules is as follows:

a. **Peacetime Training.** A total of 64 parachutists is seated in two sticks of 32. Nos. 1, 2, and 3 are seated outboard aft of the wheel well; 4 through 23 are seated on the inboard seats; and Nos. 24 through 32 are seated outboard forward on the wheel well (Figure 11-2). Parachutists are normally loaded over the aft end loading ramp.

b. **Supervisory Personnel Required.** Six personnel supervise safety measures:

- One jumpmaster.
- One assistant jumpmaster.
- Two safety personnel.
- Two ~~loadmasters.~~

(see chg 1 25 June 91)

c. **Jump Commands.** Jump commands are given in the following sequence:

GET READY.

OUTBOARD PERSONNEL, STAND UP.

INBOARD PERSONNEL, STAND UP.

HOOK UP.

CHECK STATIC LINE.

CHECK EQUIPMENT.

SOUND OFF FOR EQUIPMENT CHECK.

STAND IN THE DOOR.

GO.

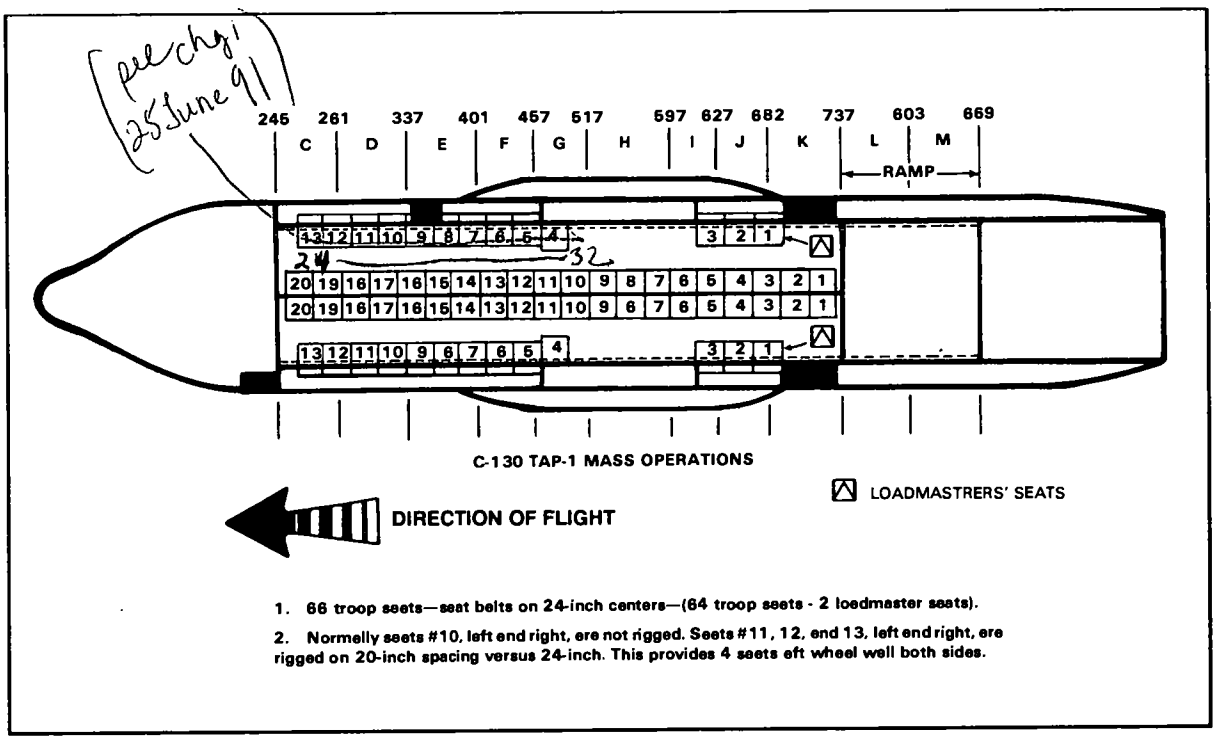

(see chg 1 25 June 91)
245 261 337 401 457 517 597 627 682 737 603 669
C D E F G H I J K L M
RAMP
C-130 TAP-1 MASS OPERATIONS
LOADMASTRERS' SEATS
DIRECTION OF FLIGHT
1. 66 troop seats—seat belts on 24-inch centers—(64 troop seats - 2 loadmaster seats).
2. Normally seats #10, left end right, are not rigged. Seats #11, 12, and 13, left end right, are rigged on 20-inch spacing versus 24-inch. This provides 4 seats aft wheel well both sides.

Figure 11-2. Seating configuration.

11-2. IN-FLIGHT RIGGING PROCEDURES

In-flight rigging procedures include the following:

a. **Personnel.** These procedures provide in-flight rigging for the airdrop of 44 personnel (with equipment) including one jumpmaster and four assistant jumpmasters. Three assistant jumpmasters are designated from the parachutists on board to assist in rigging. Two nonjumping safety person- nel are also required.

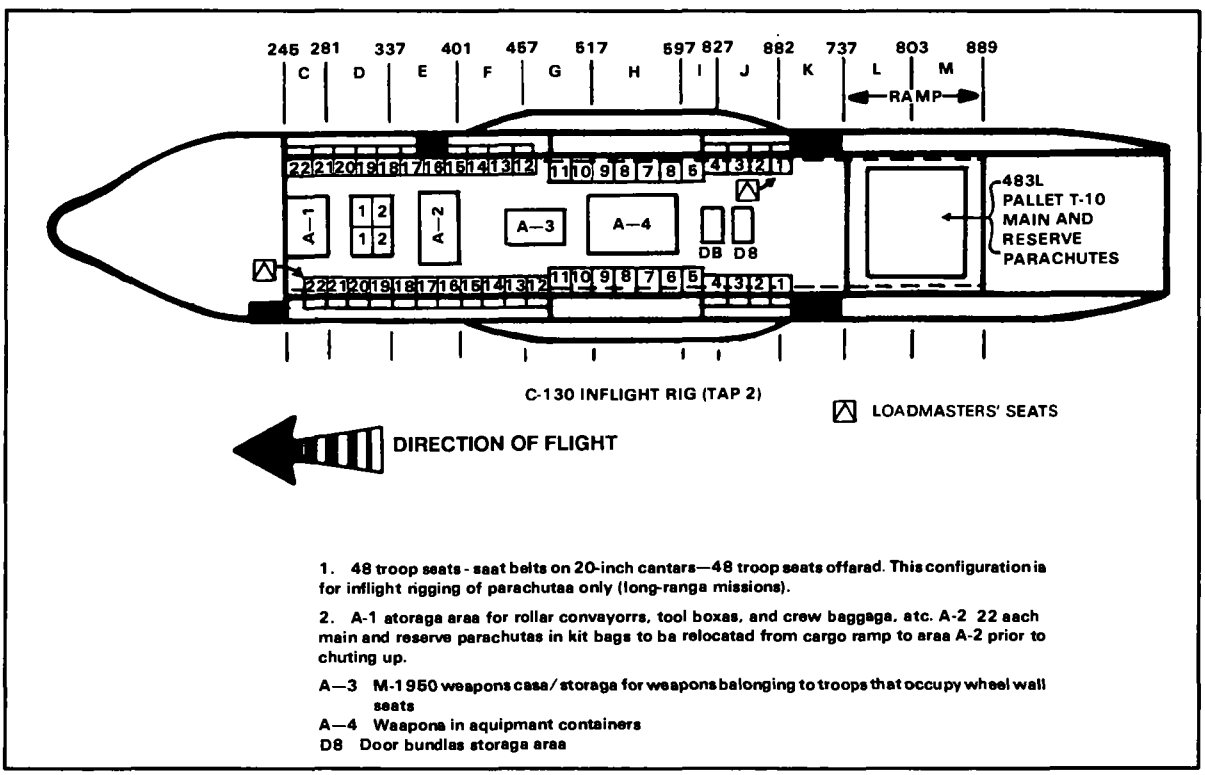
b. **Briefing.** All parachutists must be briefed and rehearsed on their actions before executing this type mission. The preferred method for in-flight rigging is buddy rigging. This allows faster rigging and reduces the parachutist's movement around the aircraft. The other method, station rigging, is seldom used.

c. **Aircraft Configuration.** The aircraft is TAP-2 configured to seat a total of 48 persons to include 2 load-masters, 2 nonjumping safety NCOs, and 44 parachutists (Figure 11-3).

d. **Storage of Equipment.** Storing equipment involves the following:

(1) Forty-four parachutes and reserves, in kit bags, are palletized (covered with a cargo net or tie-down devices) on the ramp.

(2) Door bundles are placed in the center aisle just forward of the ramp.



1. 48 troop seats - seat belts on 20-inch centers—48 troop seats offered. This configuration is for inflight rigging of parachutes only (long-range missions).

2. A-1 storage area for roller conveyorrs, tool boxes, and crew baggage, etc. A-2 22 each main and reserve parachutes in kit bags to be relocated from cargo ramp to area A-2 prior to chuting up.

A—3 M-1950 weapons case/storage for weapons belonging to troops that occupy wheel well seats
A—4 Weapons in equipment containers
D8 Door bundles storage area

Figure 11-3. Configuration for in-flight rigging (48 seats).

(3) CWIEs and DMJPs are placed in the center aisle just forward of the door bundles.

(4) M1950 weapons containers should be placed behind individual seats. Weapons containers, or personnel occupying wheel well seats, are placed on the floor at station 477.

(5) Individual equipment should be placed under seats or, if too large, may be placed in the center aisle forward of the CWIEs and DMJPs.

(6) All equipment placed in the center aisle must be secured.

e. **Buddy Rigging.** Buddy rigging begins 2 hours and 20 minutes before drop time. Rigging must be completed by the 20-minute warning.

(1) The main and reserve parachutes, with kit bags, are passed forward until each man has a parachute. Once everyone has their parachute, buddy rigging begins under the supervision of the jumpmasters, designated jumpmaster-qualified parachutists, and safety personnel. Each parachutist must know who he rigs up with.

(2) Once a parachutist is rigged, he sits down and waits to be inspected by one of the jumpmasters. The safety personnel serve as roving correction inspectors. The attachment of the static line snap hook to the top carrying handle of the reserve signifies an inspected parachutist.

(3) The primary jumpmaster supervises the entire rigging operation and assists, as needed.

(4) Once all the parachutists have been inspected, the jumpmasters rig up and safety personnel inspect them.

(5) Other jumpmaster-qualified parachutists may be used to speed up the rigging process.

f. **Station Rigging.** One rigging station is established forward of the jump doors; one additional station is established forward in the cargo compartment. Each station is manned by a safety NCO and an assistant jumpmaster. As the forward rigging station is established, 22 parachutes (in kit bags) are passed forward to the safety personnel.

(1) Starting in the center of the stick, two parachutists (one on each side of the aircraft) pick up their combat equipment. Each parachutist moves to the designated rigging station to don the parachute and equipment, assisted by the safety NCO.

(2) When completely rigged, the parachutist moves to the assistant jumpmaster (stationed nearby) for inspection. The assistant

jumpmaster attaches the static line snap hook to the top carrying handle of the reserve parachute when he reaches that portion of the inspection sequence. Only the jumpmaster or assistant jumpmaster removes the snap hook from the reserve before the command HOOK UP, since this indicates that the parachutist has received the jumpmaster's inspection.

(3) After inspection, the parachutist returns to his proper seat (or stick position). To ensure minimum time loss, the next parachutist is waiting to be rigged by the safety NCO.

(4) One jumpmaster kit bag must be present at each station.

11-3. OVER-THE-RAMP OPERATIONS

These procedures provide for over-the-ramp airdrop of 40 personnel including one jumpmaster, one assistant jumpmaster, and one nonjumping safety personnel (Figures 11-4).

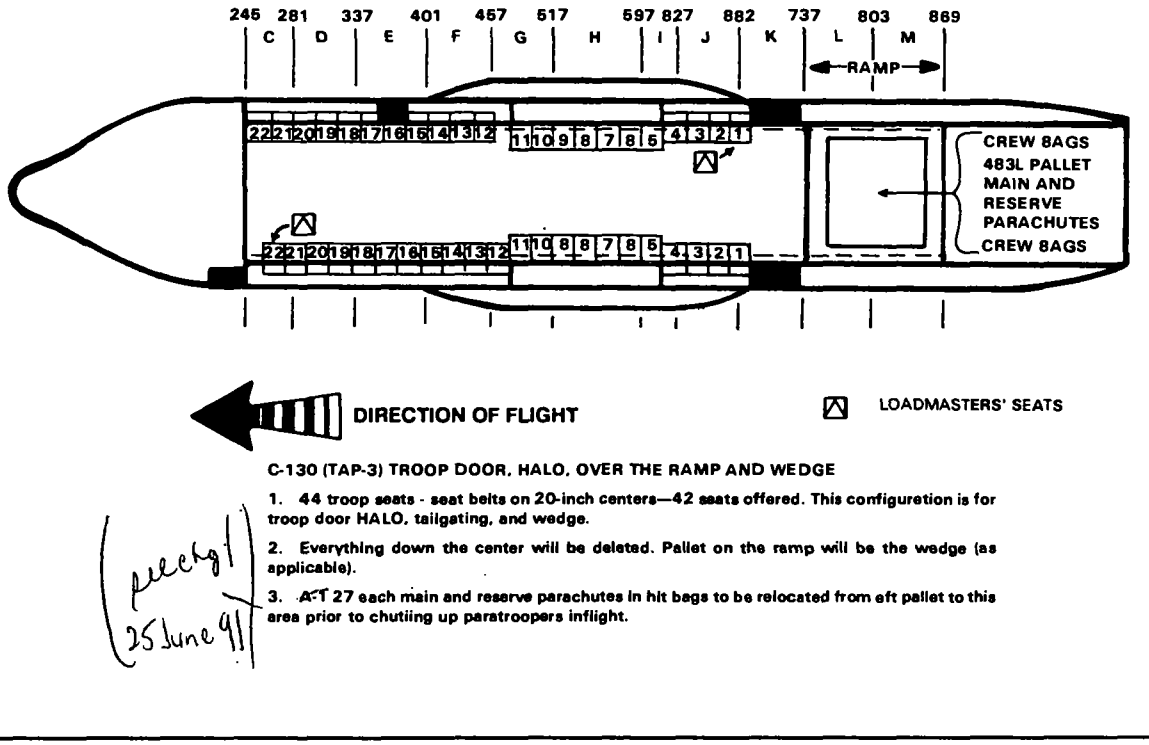

245 281 337 401 457 517 597 827 882 737 803 869
C D E F G H I J K L M
RAMP
CREW BAGS
463L PALLET
MAIN AND
RESERVE
PARACHUTES
CREW BAGS
DIRECTION OF FLIGHT
LOADMASTERS' SEATS
C-130 (TAP-3) TROOP DOOR, HALO, OVER THE RAMP AND WEDGE
1. 44 troop seats - seat belts on 20-inch centers—42 seats offered. This configuretion is for troop door HALO, tailgating, and wedge.
2. Everything down the center will be deleted. Pallet on the ramp will be the wedge (as applicable).
3. ~~A-T~~ 27 each main and reserve parachutes in hit bags to be relocated from eft pallet to this area prior to chutiing up paratroopers inflight.

Figure 11-4. Configuration for over-the-ramp operations.

a. **Equipment Drop.** Over-the-ramp operations can include the combination of an equipment drop followed by parachutists. Equipment is defined as heavy equipment rigged for airdrop, or equipment packaged and contained in the A-7A or A-21 containers. Parachutists may be dropped over the ramp without an equipment drop (maximum of 20 parachutists for each pass).

b. **Aircraft Operation.** The anchor line cables (only two are used– one on each side) are rigged from the forward outboard anchor line cable attachments to the aft inboard anchor line cable attachments. The anchor line cable stop (a clevis, padded and taped) must be installed on the anchor line cable at station 893 (20 inches from the aft anchor line cable bracket). The center anchor line cable support brackets at the door are disconnected and secured at the top of the fuselage. The static line retriever cables are tied or taped to the sides of the fuselage aft of the doors to ensure that they remain secured.

c. **Jump Commands.** Jump commands are given in the following sequence:

GET READY.

STAND UP.

HOOK UP (Figure 11-5).

CHECK STATIC LINE.

CHECK EQUIPMENT.

SOUND OFF FOR EQUIPMENT CHECK.

STAND BY.

GO.

d. **Jump Procedures.** If the jumpmaster and assistant jumpmaster elect to jump they will be the No. 1 parachutist of each stick. Therefore, the safeties control the flow of the parachutists. (pen chg 1 25 June 91)

(1) An oral ~~6~~-minute warning is given, and the jumpmaster begins the jump commands.

(2) The same sequence of jump commands and procedures are used for the door and ramp.

(pen chg 1 25 June 91)

(3) Door check is not required. If using GMRS, the jumpmaster must spot the ground marking from the left side of the ramp.

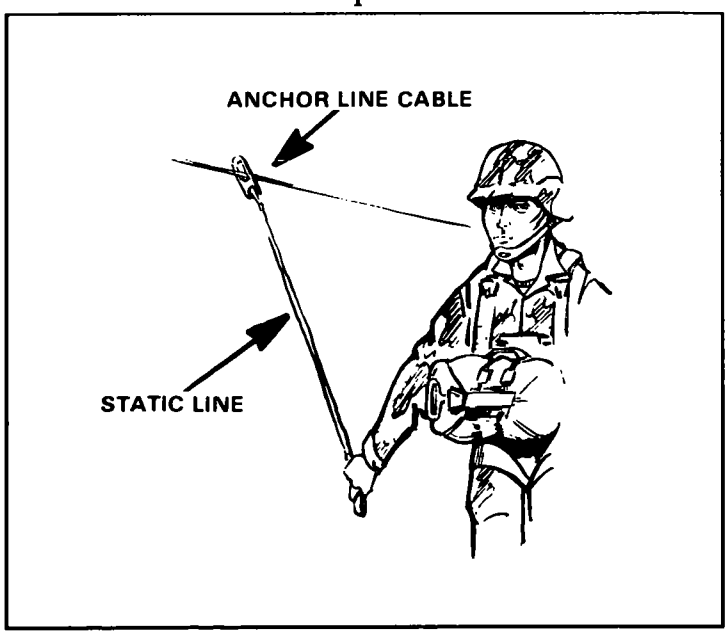


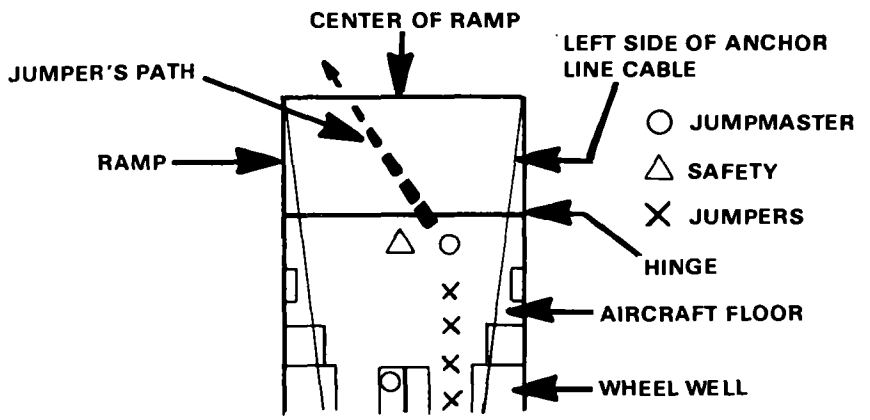
Figure 11-5. Static line grasped with reverse

(4) After giving the command STAND BY, the jumpmaster moves to the edge (center) of the ramp and exits on green light. The safety positions himself immediately behind the hinged portion of the ramp and controls the flow of parachutists.

(5) Each parachutist walks off the ramp at an angle away from the anchor line cable. (See Figure 11-6.)

11-4. COMBAT (CONCENTRATED) LOAD

A maximum of 80 parachutists can be dropped when these procedures are used for wartime emergency operations. Concentrated parachutist loading is used when not enough (C-130 and C-141B) aircraft are available. These procedures reduce individual space inside the aircraft. Crowded conditions restrict freedom of movement and present potential hazards if not supervised. Flight time beyond 1.5 hours may intensify adverse effects on parachutists. Data and seating schematics are included under appropriate aircraft titles. When the sticks are over 40 parachutists for each pass, additional safety personnel may be used to complete required safety inspections within the time warnings.



NOTE: Always angle away from the anchorline cable. Ensure that all jumpers understand that if they walk off the ramp under the anchorline cable, they take a chance of getting hit by the D-bags and static lines.

Figure 11-6. Personnel locations.

a. **Supervisory Personnel Required.** Six personnel supervise safety measures:

- One jumpmaster.
- One assistant jumpmaster.
- Two (jumping) safety personnel.
- Two loadmasters.

b. **Loading Procedures and Seating Arrangement.** The aircraft is configured to provide 19 outboard seats and 21 inboard seats with seat belts installed on 20-inch centers (Figure 11-7).

(1) Parachutists are loaded through the aft end loading ramp and seated in two sticks of 40 parachutists each. Before entering the aircraft, all parachutists release equipment leg safety straps so they can lift their equipment over the seats. These safety straps are retied when the parachutist is seated with seat belts in place.

(2) Each parachutist must be assisted in seating by safety personnel or the assistant jumpmaster who ensures that parachutists select the correct seat belt and that it is properly fastened.

NOTE: Parachutists sitting in outboard wheel well seats must place their knees forward or aft in the space of the raised seat. The area is not spacious enough to allow inboard or outboard parachutists to face each other.

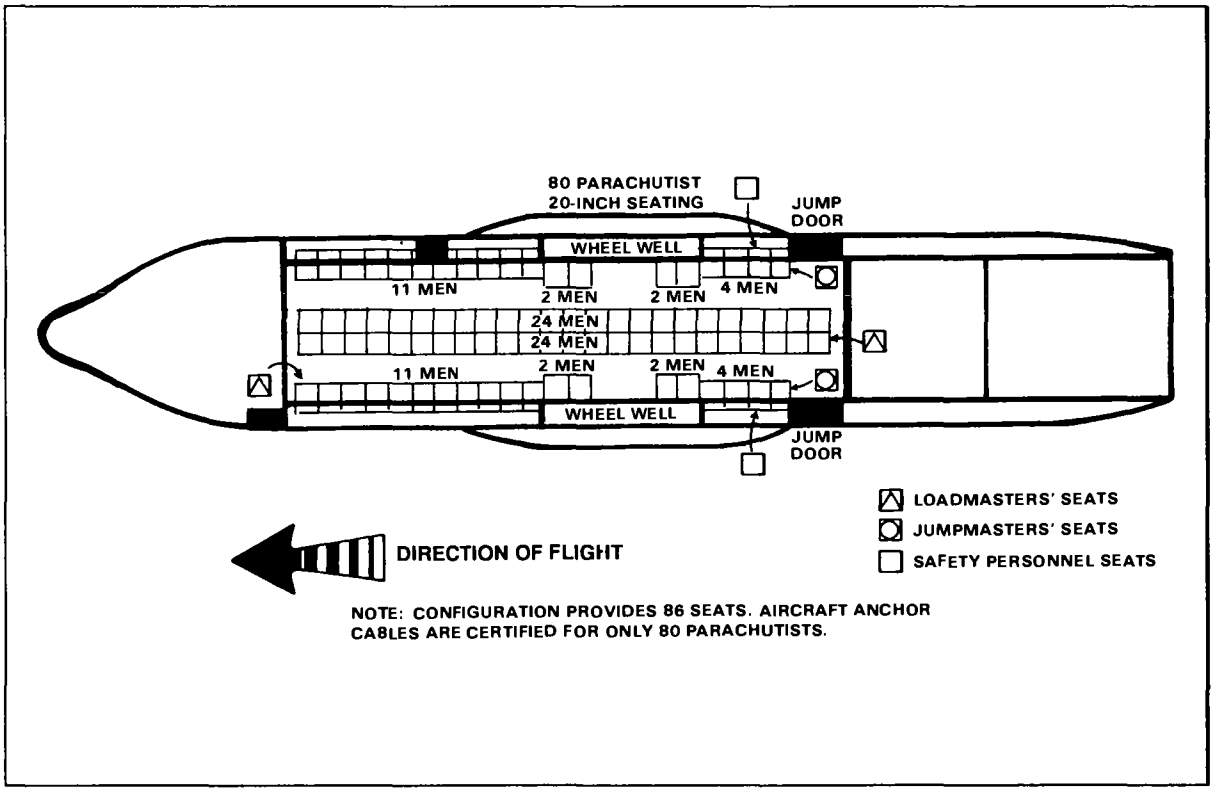


Figure 11-7. C-130 combat concentrated load.

c. **Jump Procedures.** The jump procedures for the C-130 remain the same with the following exceptions:

(1) The 30-minute warning replaces the 20-minute warning, and the 15-minute warning replaces the 10-minute warning.

(2) On the command STAND UP, inboard parachutists stand up and then stand on their seats, supporting themselves by grasping the center stanchion seat support rail. They remain in this position until outboard parachutists stand up and raise and secure their seats in the up position. On the command GET DOWN, inboard parachutists step off their seats, and raise and secure them in the up position. Standard jump commands are then resumed.

(3) On the command HOOK UP, no more than 20 parachutists hook up and exit on any single anchor line cable.

(4) When the command GO is given, outboard personnel exit in numerical sequence followed by inboard personnel.

d. **Safety Procedures.** The standard safety procedures for the C-130 apply with the following changes:

(1) Concentrated parachutist loading is used only for wartime emergency operations and requires all Army personnel to jump. This includes parachutists designated as safety personnel who conduct inspections before donning their equipment, which allows them to move freely about the aircraft. This inspection begins at the 30-minute warning to allow time for safety personnel to don their parachutes.

(2) Parachutists jumping with equipment containers are seated aft of the wheel well in outboard seats, and the equipment containers are stowed on the aircraft ramp. Jump rigging of containers begins at the 30-minute warning.

(3) During movement in the aircraft and execution of jump commands, each parachutist protects the reserve parachute rip cord grip to prevent activation of the reserve inside the aircraft.

(4) Execution of jump commands begins at the 15-minute warning. This allows for more time to stow all seats and to ensure that no more than 20 parachutists are hooked on a single anchor line cable.

(5) When preparing for airborne operations, latrine facilities should be provided. Parachutists are encouraged to use them before boarding the aircraft. This minimizes individual movement during flights.

11-5. JUMPMASTER INSPECTION

The jumpmaster inspects for the following.

a. **Seats.**

___ Enough seats are available for troop load.

___ All seats have safety belts.

___ Seat backs are secured.

___ Seats are not torn.

___ No seat projections are present.

___ Legs are locked into floor.

___ Diagonal leg brace is attached in each set section (if required).

___ Seats along the wheel well are removed (if required).

b. **Floor.**

___ Nonskid covering is in good condition.

___ It is clear and safe to walk on.

___ All cargo compartment roller conveyors and dual rail system floor sections are removed when jumping the door.

___ Loose equipment is lashed and does not interfere with movement or comfort.

c. **Jump Platform.**

___ Nonskid surface is present.

___ No cracks or bends are present.

___ Hinge plate slots are engaged by tie-down studs and screw (with washer) so that the hinge fittings do not slide off the tie-down studs. When the screw and washer are missing, the hinge plate must be safety wired to the tie-down ring bracket.

___ Two spring-down lock catches engage the edge of the door.

___ Clutch mechanism is present on the spring-down lock catches.

d. Jump Doors.

___ No excessive grease is on the door tracks.

___ No sharp edges or protrusions are on doorframes.

___ Pip pin in top, forward edge of doorframe is present.

___ Auxiliary hydraulic ramp pump handle is secured (after takeoff).

___ Doors open and close easily. (Doors are operated in flight by aircrew members.)

e. Air Deflectors.

___ No sharp edges are on trailing edge.

___ Deflectors operate electrically.

___ No items or trash is stored in wells.

f. Jump Caution Lights. (Check seven sets for operation.)

___ Set 1 - crew entrance door.

___ Sets 2 and 3 - top leading edges of right and left doors.

___ Sets 4 and 5 - trailing edges of right and left doors, waist high.

___ Sets 6 and 7 - right and left anchor cable aft supports.

g. **Anchor Cable System.**

(1) Forward support beam.

___ Four U-bolts, with self-locking nuts or nuts with cotter pins, are attached.

___ Anchor cables are attached to first and second U-bolts right, and left of center line for personnel jump.

___ Forward latch assembly is in the locked position and secured with locking pins.

(2) Anchor cable.

___ No breaks (within acceptable tolerances of TO 1C-130A-9), frays, or kinks exist.

___ Cable is clean and free of rust.

(3) Anchor cable intermediate center support.

___ Cables run through slots after ramp is closed.

___ Quick-release retaining pins are present.

(4) Anchor cable aft support.

___ Aft latch assembly is closed.

___ U-bolts, nuts, and safety pins are present.

___ Support anchor bolts, nuts, and safety pins are present.

(5) Static line retrievers.

___ Motor is operational.

___ Retriever cables are not broken within acceptable tolerances of TO 1C-130A-9, frayed, kinked, dirty, or rusty.

___ Spool clamp and shackle are attached forward of intermediate cable support and are tied to support with two turns of 1/4-inch cotton webbing.

___ Retriever cables are secured with two turns of 1/4-inch webbing to litter brackets at station 627. If cable clips are installed on the wheel well, the tie at station 627 is not used. (Retriever cable must be at least 4 inches above the anchor line cable.)

h. Emergency Equipment.

___ First aid kits (4) are present.

___ Fire extinguishers (3) are present.

___ CGU1-B cargo tie-down straps (2) (for retrieval of towed parachutists) are present.

___ Alarm system is operational.

___ Emergency exits are operational and accessible.

___ Sufficient emergency parachutes are available.

i. Miscellaneous.

___ Lighting system is operational.

___ Airsickness bags are available.

___ Comfort facilities are available.

___ Jumpmaster kit bag (extra equipment) is on board.

Section II. C-141B STARLIFTER

The C-141B is a swept-wing, long-range transport powered by four turbofan jet engines, and equipped for in-air refueling. The aircraft can be configured in different peacetime troop-carrying modes for airborne operations. Parachutists jump from the two aft doors of the aircraft (Figure 11-8).

11-6. SEATING CONFIGURATION WITHOUT COMFORT PALLET

The seating configuration for the C-141 is as follows:

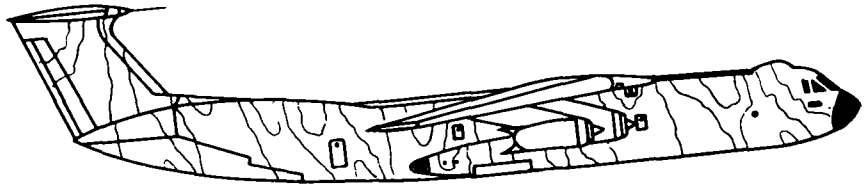
a. **Peacetime Training.** In this ADP-2 configuration, the C-141B seats ~~157~~ personnel: 153 parachutists, 2 static safety personnel, and 2 loadmasters (Figure 11-9). The maximum number of personnel for each anchor cable is 45.

b. **Supervisory Personnel Required.** Six personnel supervise safety measures.

- One jumpmaster.
- One assistant jumpmaster.
- Two static safety personnel.
- Two ~~loadmasters~~ airdrop certified/see chg 1 (25 June 91)

c. **Time Warnings.** Time warnings include the following:

(1) The 20-minute warning may be increased to 30 minutes to provide



TACTICAL TRAINING	
CONFIGURATION	**PARACHUTIST LOAD**
ADP 2 - Without comfort pallet	152
ADP 3 - In-flight rigging with comfort pallet	130
COMBAT OPERATIONS	
CONFIGURATION	**PARACHUTIST LOAD**
Concentrated Loading	180

NOTE: The C141B is not used for personnel jumping (static line) over the ramp.

Figure 11-8. C-141B Starlifter.

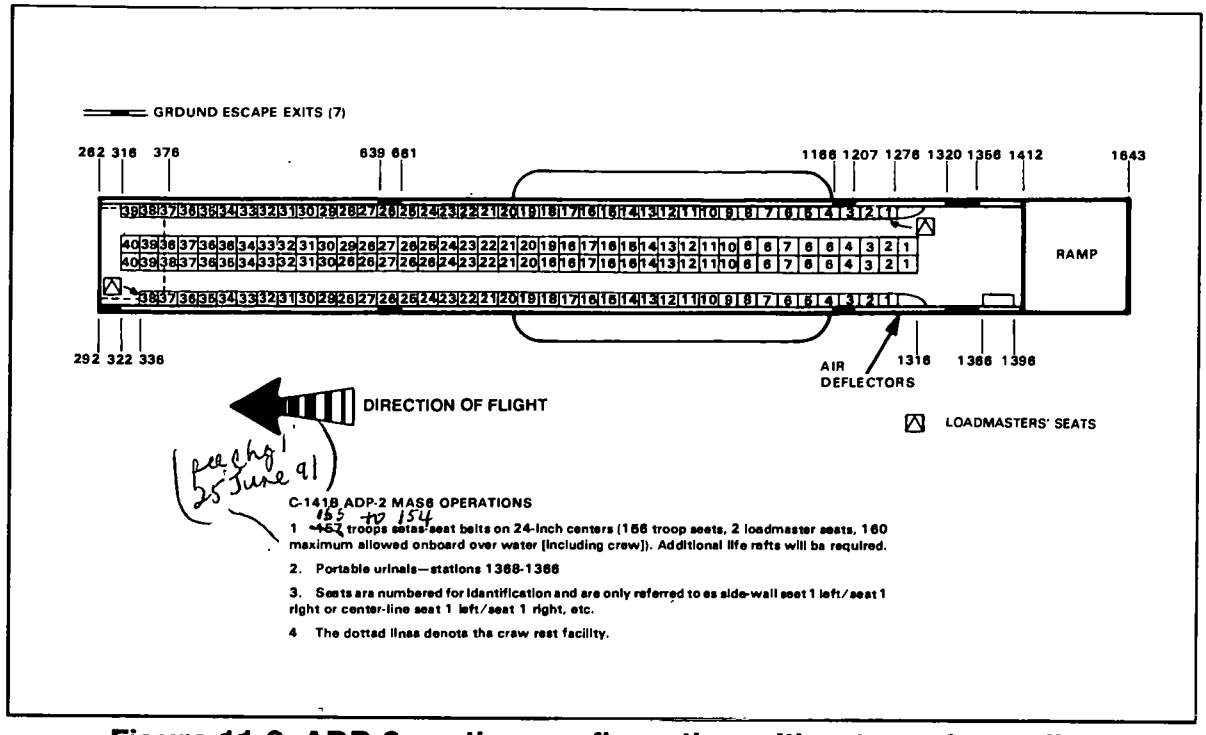

GROUND ESCAPE EXITS (7)
262 316 376
639 661
1166 1207 1276 1320 1356 1412
1643
RAMP
292 322 336
AIR DEFLECTORS
1316
1366 1396
DIRECTION OF FLIGHT
LOADMASTERS' SEATS
C-141B ADP-2 MASS OPERATIONS
1. troops seats/seat belts on 24-inch centers (156 troop seats, 2 loadmaster seats, 160 maximum allowed onboard over water (including crew)). Additional life rafts will be required.
2. Portable urinals—stations 1368-1366
3. Seats are numbered for identification and are only referred to as side-wall seat 1 left/seat 1 right or center-line seat 1 left/seat 1 right, etc.
4 The dotted lines denote the crew rest facility.

Figure 11-9. ADP-2 seating configuration without comfort pallet.

enough time for static safety personnel to complete safety checks and to rig equipment containers.

(2) The 10-minute warning may be increased to 15 minutes to allow time for parachutists to release and stow troop seats and for static safety personnel to complete safety checks before the 1-minute warning.

d. **Jump Commands.** An oral 10-minute warning is given to the jumpmaster by the loadmaster. Emphasis is on using a public address system to give jump commands, since parachutists in the forward end of the cargo compartment may not be able to see the jumpmaster's arm-and-hand signals.

GET READY.

OUTBOARD PERSONNEL, STAND UP.

INBOARD PERSONNEL, STAND UP.

HOOK UP.

CHECK STATIC LINES.

CHECK EQUIPMENT.

SOUND OFF FOR EQUIPMENT CHECK.

STAND BY. (Parachutists maintain a bight in the static line while maintaining balance with the hand nearest the aircraft fuselage.)

GO. (On the command GO, movement into the door is a normal walking pace without shuffling. Exits are made

at an angle of about 20 to 30 degrees toward the rear of the aircraft and are not vigorous [as performed from other type troop carrier aircraft]. Parachutists pass the static line to safety personnel, place hands on the ends of the reserve parachute, and exit.)

e. **Safety Considerations.** Safety personnel are seated aft to aid the jumpmaster, at the 20-minute warning, in positioning door bundles and performing other duties.

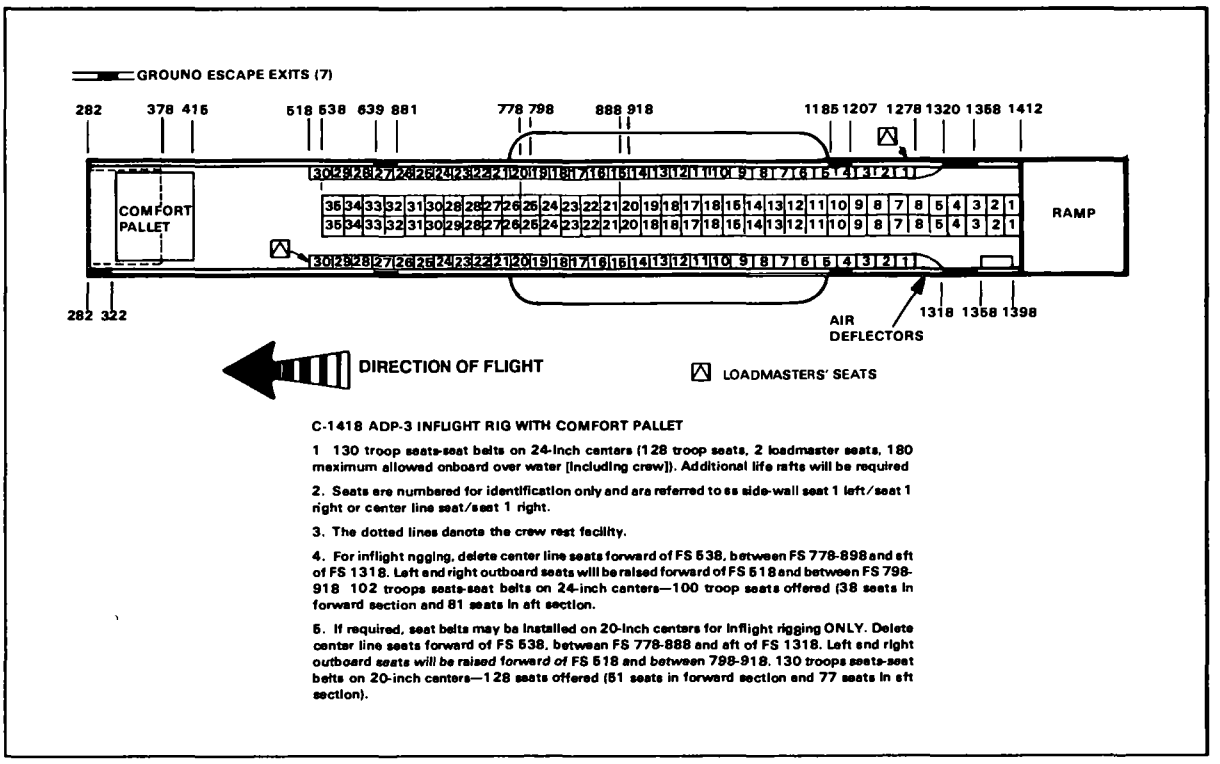
(1) Static safety personnel must complete their 20-minute checks and arrive at the forward end of the cargo compartment before the 10-minute warning.

(2) No more than 45 parachutists are hooked to any one anchor cable.

(3) Deployment bags may be trailed between passes on single drop zones, or when dropping on multiple drop zones with less than 10 minutes flight time between drop zones.

11-7. IN-FLIGHT RIGGING SEATING CONFIGURATION WITH COMFORT PALLET

In this ADP-3 configuration, the C-141B seats 134 personnel: 130 parachutists, 2 static safety personnel, and 2 loadmasters. Floor space is provided forward, midway, and aft for stowage of parachute assemblies. Seats are on a 24-inch center (Figure 11-10).


GROUND ESCAPE EXITS (7)
282 378 416 518 538 639 881 778 798 888 918 1185 1207 1278 1320 1358 1412
COMFORT PALLET
RAMP
282 322
1318 1358 1398
AIR DEFLECTORS
DIRECTION OF FLIGHT
LOADMASTERS' SEATS

C-141B ADP-3 INFLIGHT RIG WITH COMFORT PALLET

1. 130 troop seats-seat belts on 24-inch centers (128 troop seats, 2 loadmaster seats, 180 maximum allowed onboard over water [including crew]). Additional life rafts will be required.
2. Seats are numbered for identification only and are referred to as side-wall seat 1 left/seat 1 right or center line seat/seat 1 right.
3. The dotted lines denote the crew rest facility.
4. For inflight rigging, delete center line seats forward of FS 538, between FS 778-898 and aft of FS 1318. Left and right outboard seats will be raised forward of FS 518 and between FS 798-918. 102 troops seats-seat belts on 24-inch centers—100 troop seats offered (38 seats in forward section and 81 seats in aft section.
5. If required, seat belts may be installed on 20-inch centers for inflight rigging ONLY. Delete center line seats forward of FS 538, between FS 778-888 and aft of FS 1318. Left and right outboard seats will be raised forward of FS 518 and between 798-918. 130 troops seats-seat belts on 20-inch centers—128 seats offered (51 seats in forward section and 77 seats in aft section).

Figure 11-10. ADP-3 seating configuration with comfort pallet.

a. **Supervisory Personnel Required.** Fifteen personnel supervise safety measures.

- One jumpmaster.
- Six assistant jumpmaster.
- Six safety personnel (two static).
- Two loadmasters.

b. **Storage of Equipment.** Parachute assemblies (133) are placed in kit bags, and stowed and secured in three locations on the cargo floor. There are 130 parachutists seated in two sticks of 65 each on the left and right.

(1) Door bundles are stowed on the cargo ramp.

(2) Individual equipment, web gear, helmets, and ALICE packs are stowed under the troop seats; weapon containers are stowed behind the seats; and individual equipment containers (CWIE, DMJP) are stowed in the aisles or with the parachutes.

(3) One jumpmaster kit bag is stowed at each of the six rigging stations (two forward, two midway, and two aft).

c. **Buddy Rigging.** The jumpmaster initiates in-flight buddy rigging 2 hours before the 20- or 30-minute warning. Parachutists unzip the seats, place their equipment on the seats, and sit on top of the equipment. This clears the aisle for the parachutists to stand while buddy rigging.

(1) Parachutes are passed out from each of the three locations until each man has one. Then buddy rigging begins.

(2) Each parachutist must know exactly who he will rig up with. The jumpmasters, safety personnel, and designated jumpmaster-qualified parachutists supervise. Once a parachutist has been rigged, he sits down and waits to be inspected by one of the jumpmasters.

(3) Safety personnel serve as roving correction inspectors. Attaching the static line snap hook to the top carrying handle of the reserve indicates an inspected parachutist.

(4) The primary jumpmaster supervises the operation. If there are other currently qualified jumpmasters, they may be used.

(5) Once all the parachutists have been inspected, the jumpmasters rig up and safety personnel inspect them.

d. **Station Rigging.** Station rigging involves the following:

(1) Six assistant jumpmasters and six safety personnel (two static and four jumping safety personnel) are required to man the six rigging stations.

(2) Parachutists are divided into three segments and assigned to rigging stations.

(3) The jumpmaster initiates in-flight rigging 2 hours before the 20- or 30-minute warning.

(4) Before initiation of in-flight rigging, parachutists are instructed to unzip the troop seats, place their equipment on the seats, and sit on it. Placing equipment on the seats clears the aisles for parachutists moving to and from the rigging stations.

(5) Assistant jumpmasters and safety personnel at each rigging station stow their seats to provide more rigging space.

(6) Starting with two parachutists from the end of the divided sticks, each parachutist moves to a designated rigging station and is rigged by safety personnel. When completely rigged, the parachutist moves to the assistant jumpmaster (stationed nearby) for inspection. The assistant jumpmaster attaches the static line snap hook to the top carrying handle of the reserve parachute when he reaches that portion of the inspection sequence.

(7) Only the jumpmaster or assistant jumpmaster removes the snap hook from the reserve (before the command HOOK UP) since this indicates that the parachutist has received the jumpmaster's inspection.

11-8. COMBAT CONCENTRATED LOAD SEATING CONFIGURATION

In this configuration, the C-141B seats 182 personnel: 180 parachutists and 2 loadmasters (Figure 11-11). Personnel are seated on the side facing seats on 20-inch centers. Parachutists (180) are seated in two sticks of 90 each on the left and right sides. If 45 parachutists cannot be seated on the outboard seats, overflow may be seated inboard aft on available center seats. The jumpmaster must ensure that only 45 parachutists hook up to the outboard/outboard anchor cables.

NOTE: Concentrated parachutist loading is used in wartime emergency operations when not enough (C-130 and C-141B) aircraft are available. These procedures reduce individual space inside the aircraft. Crowded conditions restrict freedom of movement and present potential hazard if not supervised. Flight time beyond 1.5 hours may intensify adverse effects on parachutists. Data and seating schematics are included under appropriate aircraft titles. Additional safety personnel may be used if the sticks are over 40 personnel for each pass to complete the required safety inspection within the time warnings.

a. Supervisory Personnel Required. Six personnel supervise safety measures.

- One jumpmaster.
- One assistant jumpmaster.
- Two (jumping) safety personnel.

- Two loadmasters.

b. **Jump Procedures.** Jump procedures involve the following:

(1) The jump procedures for the C-141B remain the same with the following exceptions: the 30-minute warning replaces the 20-minute warning, and the 15-minute warning replaces the 10-minute warning.

(2) Emphasis is on using the aircraft public address system for giving the jump commands since parachutists in the forward end of the cargo compartment cannot see the jumpmaster's arm-and-hand signals.

c. **Safety Considerations.** Safety personnel are seated aft to aid the jumpmaster, at the 30-minute warning, in positioning door bundles and performing other duties. The jumpmaster ensures that not more than 45 parachutists are hooked to any one anchor line cable.

(1) The standard safety procedures for the C-141B apply with the following changes:

(a) Concentrated parachutist loading is used only for wartime emergency operations and requires all Army personnel to jump. This includes parachutists designated as safety personnel who conduct safety inspections before donning their equipment, which allows them to move freely about the aircraft. This inspec-

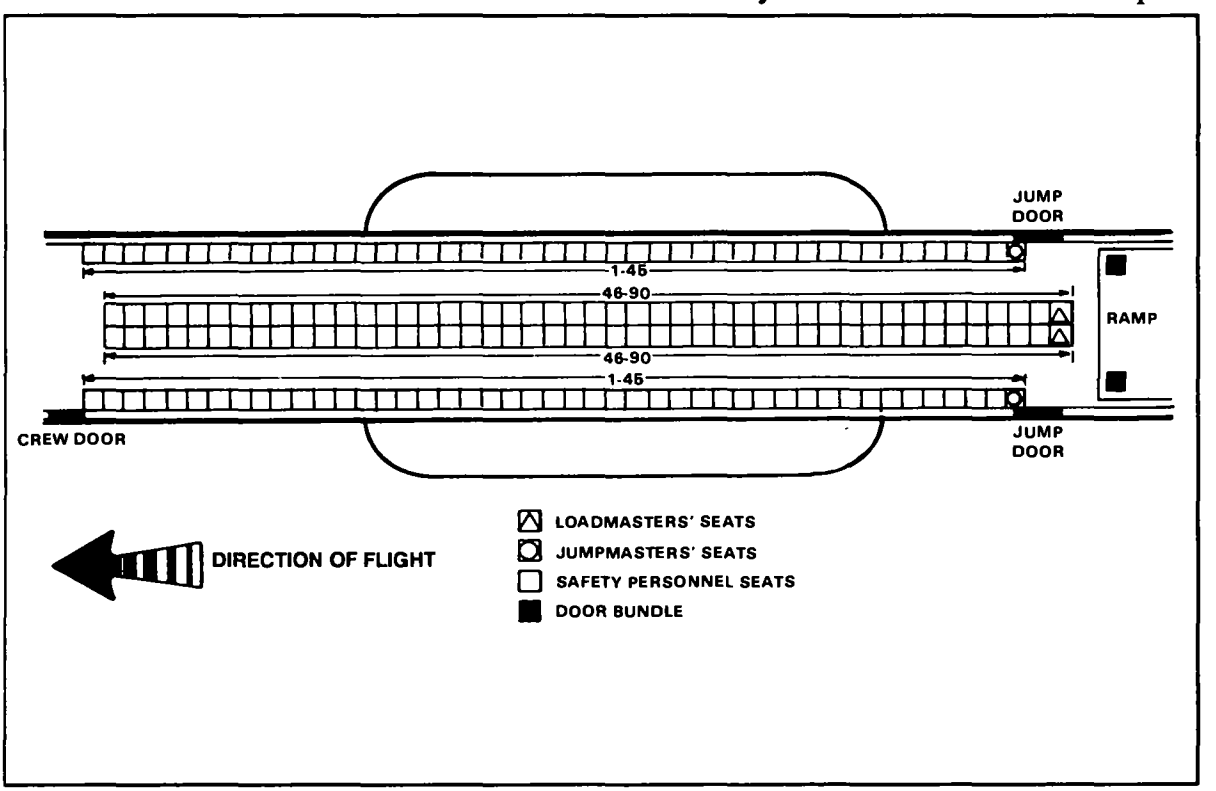


Figure 11-11. C141B configured for combat load (182 seats).

tion begins at the 30-minute warning to allow adequate time to complete inspection and to provide time for safety personnel to don their parachutes.

(b) During movement in the aircraft and execution of jump commands, each parachutist protects the reserve parachute rip cord to prevent activation of the reserve inside the aircraft.

(2) Deployment bags are trailed between passes on single drop zones, or when airdropping on multiple drop zones with less than 10 minutes flight time between drop zones. There is no time to retrieve, detach, and stow the deployment bags, and rerig the retrieval system between passes or drop zones.

11-9. JUMPMASTER INSPECTION

The jumpmaster inspects for the following.

a. **Seats.**

___ Enough seats for troop load are present.

___ All seats have safety belts.

___ Seat backs are secured.

___ Seats are not torn.

___ No projections exist through seats.

___ Legs are locked into floor.

b. **Floor.**

___ Nonskid covering is in good condition.

___ Floor is clean and safe to walk on.

___ Roller conveyors are stowed.

___ Loose equipment is secured in the cargo ramp area and does not interfere with troops.

c. **Jump Platforms.**

___ Nonskid surface is present.

___ No cracks or bends exist.

___ Studs are locked in seat track receptacles.

___ Tie-down fitting is locked.

___ All bolts and nuts are present.

___ Platforms swing in and out easily.

___ The two spring-down lock catches engage the edge of the door.

d. **Jump Doors.**

___ No excessive grease on the door tracks exists.

___ No sharp or protruding edges exist on doorframes or on loading strut door (aft and down from jump door).

___ Doors open and close easily.

___ Door lever catches are operational.

e. **Air Deflectors.**

___ No sharp edges.

___ Deflectors operate electrically.

f. **Jump Caution Lights.** (Check seven sets for operation.)

___ Set 1 - crew entrance door.

___ Sets 2 and 3 - top leading edges of right and left doors.

___ Sets 4 and 5 - trailing edges of right and left doors, waist high.

___ Sets 6 and 7 - right and left anchor cable aft supports.

g. **Anchor Cable System.**

(1) Check forward support beam.

___ Bolts and nuts are present and tight.

___ Anchor cables are attached to first and third anchor points right and left of center line for personnel jumps.

___ Cable, bolts, nuts, and safety wire are present.

___ Turnbuckle is secured with safety wire.

(2) Anchor cable.

___ No breaks (within acceptable tolerances of TO 1C-141B-1), frays, or kinks exist.

___ Cable is clean and free of rust.

___ Cable swage is present.

(3) Anchor cable intermediate support.

___ Cables run through slots after ramp is closed.

___ Quick-release retaining pip pins are present.

(4) Static line retrievers.

___ Motor is operational.

___ Retriever spools are secured forward of intermediate cable support and tied to supports with one turn of double 1/4-inch cotton webbing.

___ Retriever cables are not broken within acceptable tolerances of TO 1C-141B-1, frayed, or kinked.

___ Retriever cables are secured in spring clips.

___ Retriever bar is available, one for each door.

NOTE: Retriever cable must be at least 4 inches above the anchor line cable.

h. **Emergency Equipment.**

___ Public address system is operational.

___ First aid kits (4) are present.

___ Fire extinguishers (3) are present.

___ Alarm system is operational.

___ Emergency exits are operational and accessible.

___ Sufficient emergency parachutes are available.

i. **Miscellaneous.**

___ Lighting system is operational.

___ Airsickness bags are available.

___ Comfort facilities are present.

___ Jumpmaster kit bag (extra equipment) is on board.

CHAPTER 12

ARMY AIRCRAFT

Army aircraft can be used for airdrop operations when special missions are conducted employing small-unit forces. The aviation supporting unit is responsible for preparing the aircraft for equipment and personnel drops to include seat and door removal (if required), and installation or rearrangement of seat belts. The installation of field-expedient anchor line cable is the jumpmaster's responsibility. Aircraft preparation is usually accomplished jointly by the crew chief and jumpmaster.

Section I. SAFETY CONSIDERATIONS

Although safety considerations for each aircraft are discussed, the requirements below apply to all Army aircraft (unless otherwise indicated).

12-1. GROUND TRAINING

Unit commanders should require all personnel to participate in ground training immediately before the jump. The parachutists are shown the correct movement procedures inside the aircraft and exit procedures, and are required to practice and demonstrate these procedures to the jumpmaster's satisfaction before the jump. Different techniques are involved in jumping from Army aircraft; failure to conduct ground training may result in a serious jump accident.

12-2. MOVEMENT IN AIRCRAFT

The pilot is briefed to expect rapid shifts in the aircraft's center of gravity during stand up, hook up, and exit of parachutists.

12-3. RESERVE PARACHUTE

Crowded conditions inside the cargo compartment could cause accidental activation of the reserve parachute, creating an extremely hazardous situation. During movement, the rip cord grip of the reserve parachute is guarded by placing the right

hand and forearm over the front of the reserve. This allows the parachutist to control the pilot chute and canopy in case of accidental activation.

12-4. SPACE LIMITATIONS

The total number of parachutists and air delivery containers must conform to the weight and space limitations of the specific aircraft involved.

12-5. SIX-SECOND COUNT

Due to the slow forward speed of helicopters and the downward rotor wash, the time interval between exit and full deployment of T-10B or MC1-1B parachutes requires about 100 feet more altitude. Due to the longer opening time, the parachutist extends the normal four-second count to a six-second count.

12-6. STATIC LINE

Static lines and deployment bags are retrieved by the jumpmaster or crew chief immediately after the last parachutist is clear. The equipment is secured as soon as the deployment bags and static lines are retrieved inside the aircraft. If the door on the aircraft can be closed, the static lines can be removed from the anchor cable or attaching point; otherwise, the static lines are not detached until the aircraft is on the ground.

12-7. CROWDED CONDITIONS

Crowded conditions inside these aircraft dictate that caution be used to prevent entanglement or misrouting of static lines during the parachutist's exit. Each parachutist is cautioned to watch the static line of the preceding parachutist and to be observant of all the static lines trailing from the lower aft corner of the cargo or personnel door. This precaution is necessary to ensure that succeeding parachutists do not jump until the parachute of the preceding parachutist has deployed, and that the deployment bag has trailed to the rear of the aircraft.

12-8. CONTAINER LOADS

If container loads are to be airdropped from bomb shackles (wing load), helicopter hook, helicopter door, bomb bay, or the doors of utility airplanes, they must be rigged using parachutes equipped with breakaway static lines. Container loads using breakaway static lines may be airdropped from the ramp or rear end (tailgate) of cargo and transport-type aircraft. Container loads with breakaway static lines are not rigged for airdrop from the troop door (side door) of cargo and transport-type aircraft. These parachutes are equipped with a drogue device if parachutists follow the door bundles. Parachutists are not dropped simultaneously with bundles that are rigged for release from bomb shackles or cargo hooks.

12-9. HOOKUP PROCEDURES

When using Army aircraft for airborne operations, the hookup procedures may differ from the standard hookup procedures used in USAF troop carrier aircraft. This is due to the location of the anchor cables. Also, the jumpmaster may hook up the individual parachutist. Unless otherwise specified in the hookup procedures for each aircraft, the rule should be to hook up with the open portion of the snap hookup (or to the front of the aircraft) with all static line snap hooks facing the same direction. This permits rapid, visual inspection before the jump and easy removal of the static lines after the jump.

12-10. TOWED PARACHUTIST PROCEDURES

The jumpmaster notifies the pilot that a parachutist is being towed. The jumpmaster recovers and stores all other deployed static lines and deployment bags. The pilot slowly descends to the DZ or other appropriate site and brings the aircraft to a hover. The jumpmaster unhooks the towed parachutist's static line, deplanes, and detaches the towed parachutist.

Section II. UH-1V/M IROQUOIS

The UH-1V/M is powered by a single gas turbine engine. Eight combat-equipped parachutists can jump from the aircraft (Figure 12-1).

12-11. PREPARATION AND INSPECTION

a. **Preparation.** The following steps prepare the UH-1V/M for jumping:

(1) Both cargo compartment doors are locked in the open position. If the doors cannot be locked, they are removed.

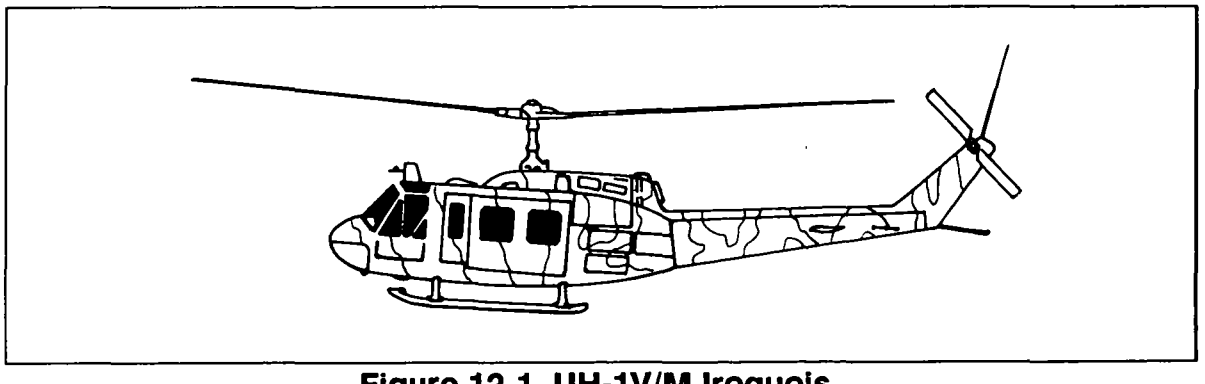


Figure 12-1. UH-1V/M Iroquois.

(2) All troop seats are removed except one seat on each side (located to the rear of the pilot and copilot seats). These two seats are installed so they are facing to the rear of the aircraft. If the parachutists are equipped with combat equipment and eight parachutists are to jump, all seats in the cargo compartment are removed.

(3) The door and frame are inspected to ensure there are not sharp edges that could cut or fray static lines. If these are determined hazardous, corrective action is taken before the helicopter is jumped.

(4) Under field conditions, the door and frame can be padded and taped to preclude a mission abort. Otherwise, the aircraft is returned to maintenance for correction of the deficiency.

(5) Safety belts are attached to the tie-down rings on each side of the compartment for floor-seated parachutists.

(6) The door gunner/crew chief foot-operated radio switch may be unscrewed (by hand) before jumping. The exposed radio switch wires are taped to prevent an electrical short. If the switch is not removed, it is padded and taped. The ground-handling, wheel-mounting brackets on both landing skids are padded with cellulose wadding and taped (Figure 12-2). Some aviation units have fabricated special covers that may be used to cover the wheel mounting brackets.

b. Anchor Line Systems. Two anchor line systems are available for UH-1V/M aircraft for airdrop of personnel. They are the standard overhead system and the expedient system

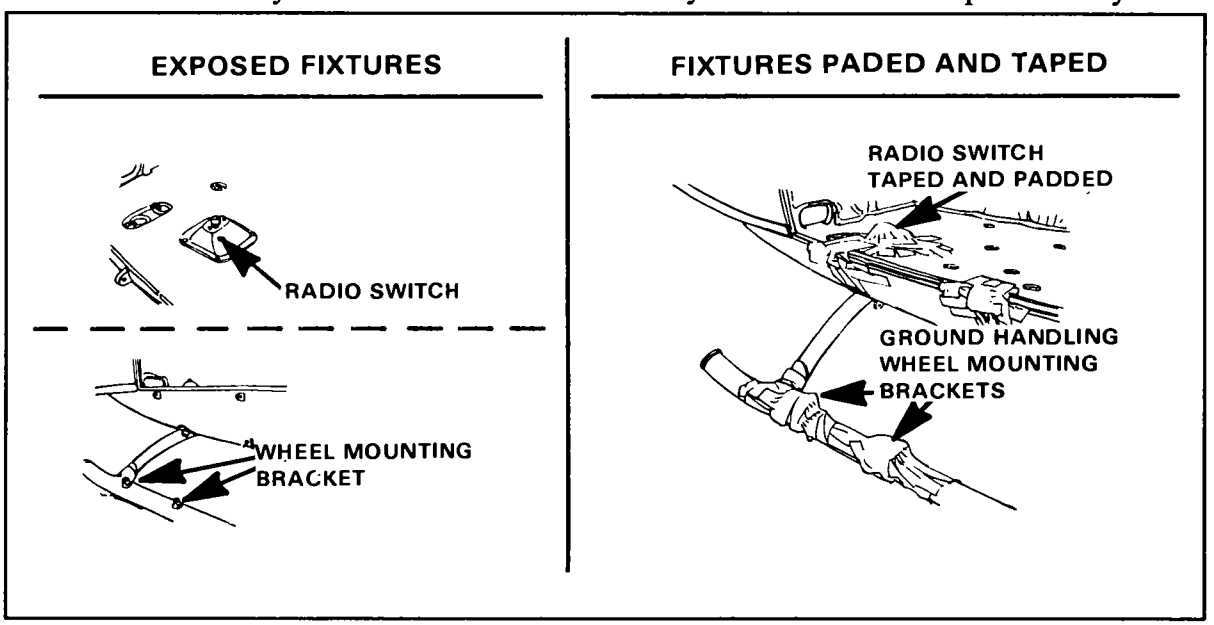


Figure 12-2. Exposed fixtures padded.

(Figure 12-3). The expedient system (A-7A anchor line cable assembly) consists of cotton A-7A strap, four D-rings, and four connector straps (TM 10-1670-240-20/TO 13C7-49-11 authorized the fabrication of the A-7A strap from Type X cotton webbing). Nylon A-7A straps may be used with cotton buffers on the D-rings and connector snaps.

c. **Assembly Installation.** An assembly is installed on each side of the aircraft. It can be installed quickly by means of four tie-down rings located on the floor on the right and left sides of the aircraft compartment. The A-7A strap is threaded through the D-rings, which are used for attachment of the static line snap hooks.

(1) *Left door.* For the left door, one connector snap on the A-7A strap is attached to the tie-down ring No. G-2. The strap is connected to the tie-down ring No. F-4. Four D-rings are on the strap with the round part of the rings facing outboard (of aircraft). The strap is then connected tie-down ring No. K-3 and tie-down ring No. J-4. The free end of the strap is secured to the strap fastener, and any excess between tie-down rings No. J-4 and No. G-2 is taped.

(2) *Right door.* The same procedures apply to the right door as the left except that the A-7A strap is attached to tie-down ring No. G-1, then to F-2. Four D-rings are on the strap with the round part of the rings facing outboard (of aircraft). The free end of the strap is secured to tie-down rings No. K-2 and No. J-3, and the strap fastener is secured. Excess strap between

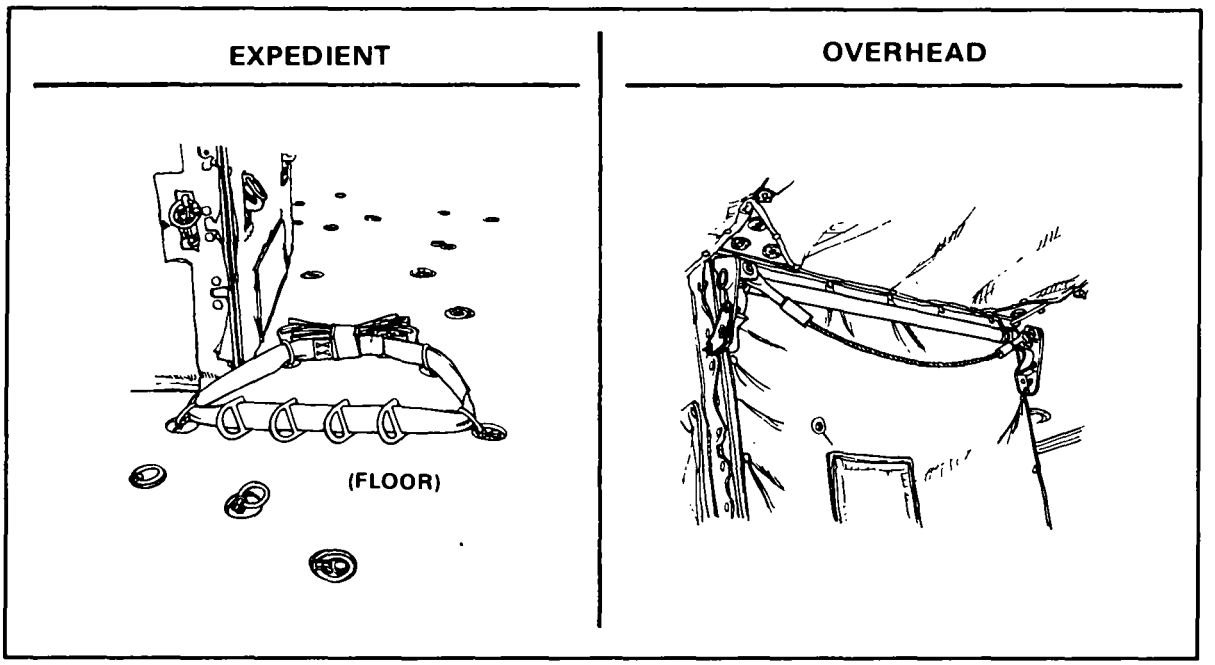


Figure 12-3. Anchor line system.

tie-down rings No. J-3 and No. G-1 is taped.

d. **Inspection.** Before enplaning, the jumpmaster and pilot, or pilot's representative, jointly inspect the aircraft to determine the following:

(1) All protruding objects near the cargo compartment doors are removed or taped.

(2) The lower right and left aft edges of the right cargo compartment door is padded and taped (if required).

(3) The anchor line cable is secure.

(4) A safety belt is available for each parachutist.

12-12. LOADING TECHNIQUES AND SEATING CONFIGURATION

Parachutists Nos. 1 through 4 enter the cargo compartment through the right door, are hooked up by the jumpmaster in numerical order, and seat themselves (Figure 12-4). Parachutists Nos. 5 through 8 enter the cargo compartment through

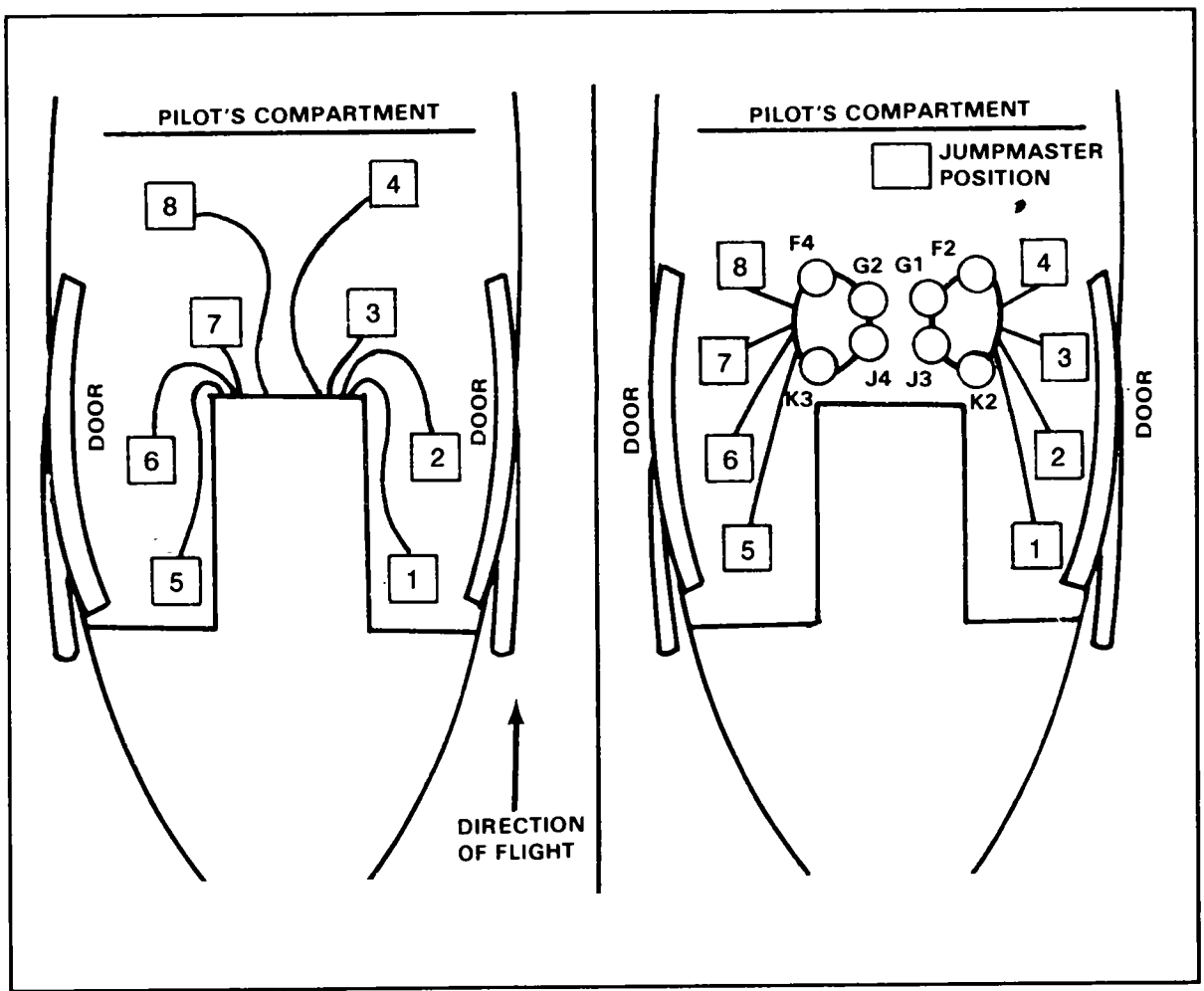


Figure 12-4. Seating configuration for the UH-1V/M.

the left door, are hooked up by the jumpmaster in numerical order, and seat themselves.

a. The jumpmaster ensures excess static line is stowed as he hooks up each parachutist.

b. The open portion of the static line snap hook faces the front of the aircraft.

c. For short flights (less than 25 minutes), parachutists may sit in the door with their feet outside the cargo compartment.

12-13. JUMP COMMANDS

The jumpmaster issues the following commands:

a. **GET READY.** The command is given four minutes or less from drop time, and the aircraft is level for final approach. All seat belts are unlatched and moved to the rear of the parachutists. The jumpmaster visually inspects each safety belt to ensure that it is clear of the parachutist and the equipment.

b. **CHECK STATIC LINES.** The jumpmaster rises and checks the routing of static lines from the point of attachment to the pack tray to ensure they are properly routed and hooked up.

c. **CHECK EQUIPMENT.** All parachutists check their equipment.

d. **SOUND OFF FOR EQUIPMENT CHECK.** On this command, No. 1 parachutist indicates OKAY orally to the jumpmaster. The remaining parachutists follow in order.

e. **SIT IN THE DOOR.** This command is given by the jumpmaster 30 seconds from drop time. Nos. 1 and 2 parachutists swing their legs to the right and take sitting positions in the door with feet together outside the cargo compartment. (Nos. 3 and 4 extend their legs outside and move to sitting positions.) They place both hands, palms down, on the floor alongside their thighs, turn their heads toward the jumpmaster, and wait. Nos. 5 and 6 swing their legs to the left, take sitting positions in the left door, and follow the same procedures as Nos. 1 and 2 (Nos. 7 and 8 extend their legs outside and move to sitting positions.) (This command is omitted if the parachutists are already sitting in the door on a short flight.)

f. **STAND BY.** The command is given 8 to 10 seconds before the command, GO.

g. **GO.** This command is given orally by the jumpmaster to No. 1 parachutist who pushes up and out with both hands, followed by Nos. 2, 3, and 4. When No. 4 has cleared the aircraft, the jumpmaster signals No. 5 to GO. Nos. 5 through 8 exit from the left door in order. The jumpmaster controls the exit of all parachutists, maintaining a one-second interval. When an air delivery container is being released from the cargo hook, the pilot releases the container and informs the

jumpmaster when the load has cleared the aircraft. The jumpmaster then commands GO to the first parachutist, who is followed by the remaining parachutists.

12-14. ARCTIC OPERATIONS

If the helicopter has skis, the ski attaching bolts and the sharp edges of the skis are padded and taped on the outboard side of the landing skids aft of the leading edge of the cargo door. Due to the bulk and weight or arctic clothing, individual equipment is not worn. The equipment is dropped either as an internal or external load.

12-15. SAFETY

a. **Parachutists.** During movement inside the aircraft, the parachutist guards the rip cord grip. Crowded conditions inside the cargo compartment and the open doors on both sides of the fuselage pose a potentially hazardous situation regarding accidental activation of the reserve parachute.

b. **Jumpmaster.** The jumpmaster ensures all parachutists remain secured by their safety belts until the command GET READY is given. The jumpmaster takes appropriate measures to prevent (or correct) excessive static line from flopping about the aircraft. (The jumpmaster does not jump from this aircraft.)

c. **Equipment.** Equipment prescribed in Chapter 6 can be worn by parachutists when jumping this aircraft.

(1) Standard air delivery containers rigged with G-13 or G-14 cargo parachutes can be delivered from the cargo hook, using the breakaway static line (TM 10-500-6). The snap hooks of the static lines are hooked to the anchor line system before lift-off. Door bundles reduce the number of parachutists that can be carried, depending on the size and number of bundles.

(2) When the CWIEs are jumped (two maximum), they are attached to No. 3 and No. 7 parachutists (one for each door). The DMJP may not be jumped from aircraft that requires parachutist to sit on the floor.

d. **Aircraft.** The indicated airspeed of the aircraft during jumps is not less than 50 knots or more than 70 knots. The minimum drop altitude is 1,500 feet above ground level. After the last parachutist has cleared the aircraft, the static lines are retrieved inside the aircraft and secured in an aviator's kit bag or secured by a safety belt to the aircraft floor. The static line snap hooks are not removed from the anchor line cable until the aircraft lands.

Section III. UH-60A BLACK HAWK

The UH-60A is a twin-turbine, medium-speed, single-main rotor helicopter (Figure 12-5). Eight combat-equipped parachutists can jump from this aircraft.

NOTE: On missions requiring a crew chief and a window gunner, the maximum number of parachutist is reduced to six. Static line parachute operations require a static jumpmaster.

12-16. PREPARATION AND INSPECTION

a. **Preparation.** The following procedures prepare the UH-60A for jumping (Figure 12-6).

(1) Lock both cargo doors in the open position.

NOTE: For arctic or other cold-weather operations, or during flights of long duration, the aircraft doors may be closed and locked. Doors cannot be opened during flight. The aircraft must either land or hover near the ground to open the doors. This procedure requires coordination between the supporting aviation and airborne units for the jump.

(2) Remove seats in the cargo department (except as required by aircraft crew).

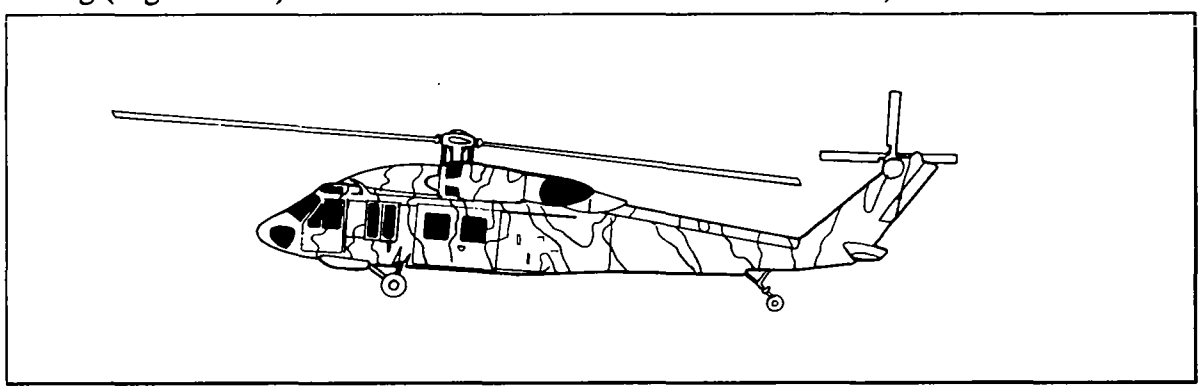


Figure 12-5. UH-60A Black Hawk.

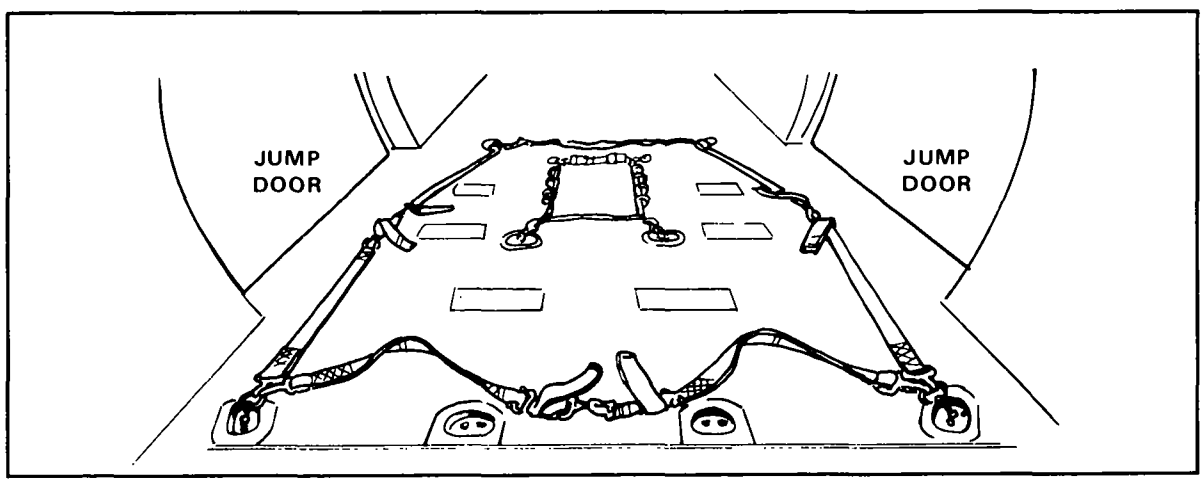


Figure 12-6. Compartment prepared for jumping.

(3) Tape cargo floor troop seat and tie-down fitting wells in front of the cargo doors.

(4) Tape sharp edges and tie-down fitting wells on the cargo floor and door jambs that could cut or fray static lines, or could snag parachutists' equipment.

(5) Tape the cargo door(s) weather stripping below the door catch (Figure 12-7).

NOTE: Tape must not interfere with closing, locking or unlocking, and opening the cargo doors in flight. If the weather stripping below the cargo door(s) catch is missing, pad the door edge with felt and tape in place. Padding must not preclude closing the cargo doors.

b. **Modified Anchor Line System.** Install a floor-mounted anchor line system (Figure 12-8), using a modified STABO extrac-tion system anchoring strap assembly (NSN 1670-00-999-3544; TM 10-1670-262-12 and TM 10-1670-251-12). To modify the STABO, remove two of the connector snaps (leaving four) and add two D-rings (NSN 1670-00-360-0466). The cotton buffers may be locally manufactured.

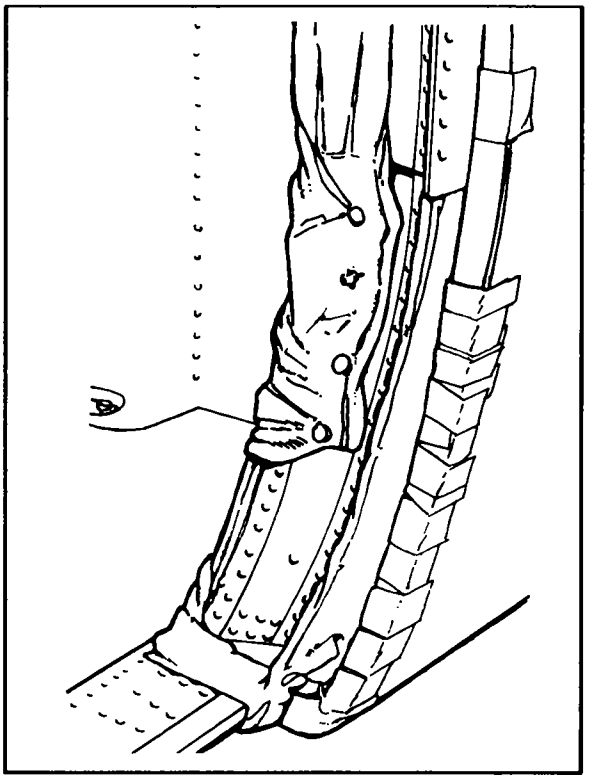


Figure 12-7. Door edge padded and taped.

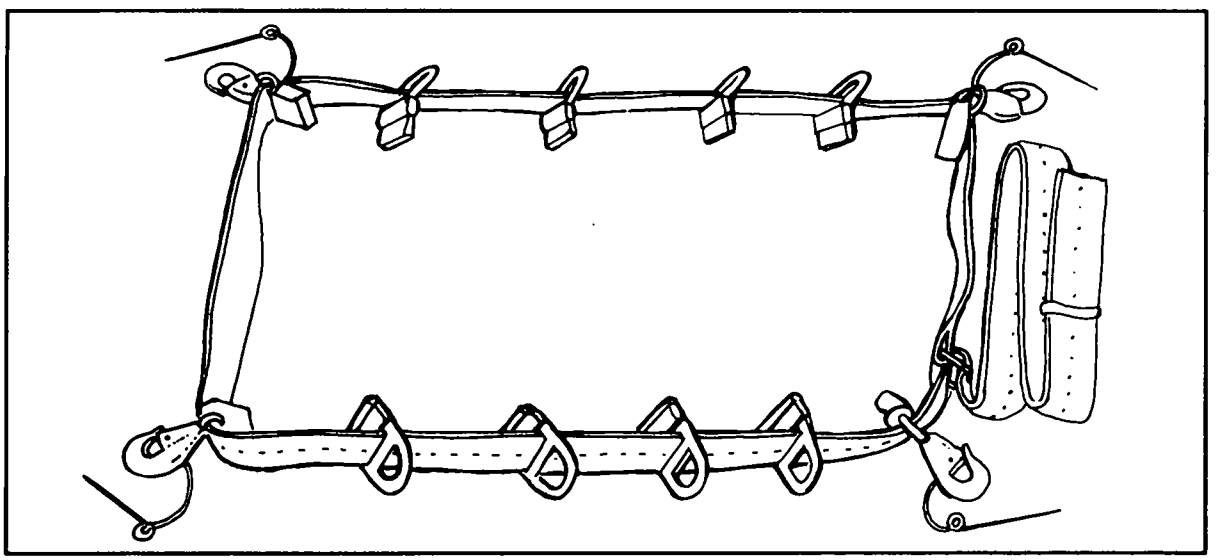


Figure 12-8. Modified anchor line.

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(1) Install four snap hooks and eight D-rings with cotton buffers on the anchor web loop, with the snap hooks and D-rings facing out in the following order: one snap hook, four D-rings; two snap hooks, four D-rings; and one snap hook (Figure 12-9).

(2) Insert about 30 inches of the web loop running end into the quick-fit adapter to secure the loop.

(3) Center the anchor line system on the cargo floor with the quick-fit adapter to the rear. Attach the snap hooks to tie-down fittings 3B, 3C, 4B, and 4C. Insert the safety wires and tape the snap hooks.

(4) Center the quick-fit adapter between tie-down fittings 4B and 4C, and tighten the web loop by pulling on the loop running end. Secure the web loop running end with an overhand knot. Fold and tape excess webbing to the web loop.

c. **Safety Belt Installation.** Install three floor-mounted safety belts.

(1) Attach a standard safety belt to tie-down fittings 5A and 5C for the jumpmaster. (Not necessary unless

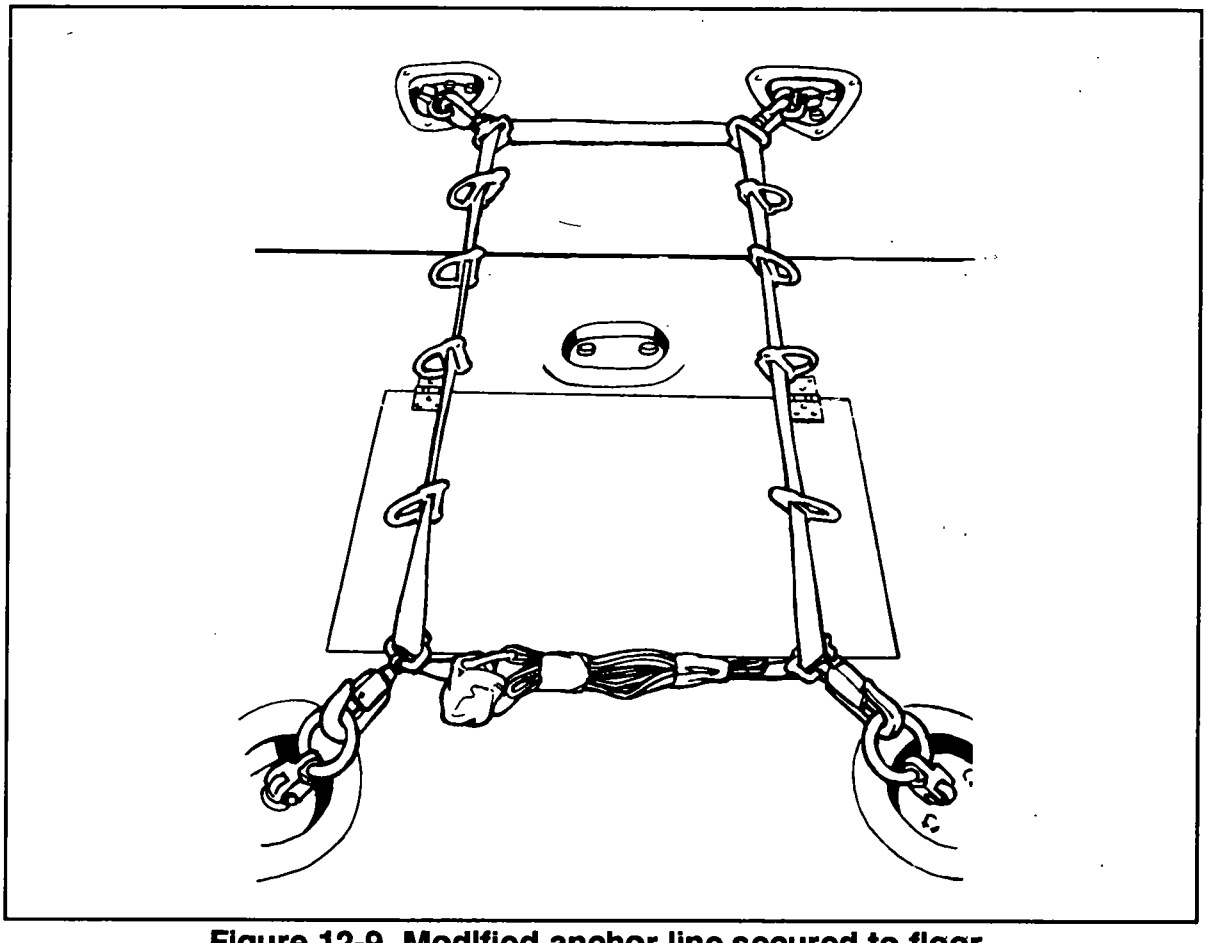


Figure 12-9. Modified anchor line secured to floor.

a seat has not been left for the jumpmaster.)

NOTE: The UH-60A cargo compartment configuration and floor tie-down fitting pattern preclude use of standard (individual) safety belts. Therefore, parachutists are restrained in groups of two and three, using modified safety belts.

(2) Attach an 86-inch-long (extended) safety belt to forward tie-down fittings 1A and 1D.

(3) Attach a 112-inch-long (extended) safety belt to tie-down fittings 1A and 5A, left door.

(4) Attach a 112-inch-long (extended) safety belt to tie-down fittings 1D and 5C, right door.

(5) Ensure that a serviceable safety harness is available for the jumpmaster (and the crew chief, when required). The jumpmaster's safety line is attached to tie-down fitting 5B. The crew chief's safety line is attached to tie-down fitting 1A or 1D, as required. If safety harnesses are not available, a backpack-type parachute may be used.

WARNING: MOVEMENT IS CONTROLLED TO PRECLUDE INADVERTENT PARACHUTE ACTIVATION IN THE CARGO COMPARTMENT.

d. Inspection. Before enplaning, the jumpmaster and pilot, or pilot's representative, jointly inspect the aircraft to determine the following:

(1) All loose objects in the cargo compartment are removed or secured forward.

(2) Sharp edges and tie-down fitting wells on the cargo floor and doorjambs (that could cut or fray static lines, or could snag the parachutists' equipment) are padded and taped.

NOTE: Door catches and handles are not taped.

(3) Cargo doors are locked in the open position and cleared for closing, depending on mission requirements.

(4) The anchor line system is complete, serviceable, and properly installed.

(5) Three serviceable safety belts (modified) are installed on the cargo floor.

(6) A headset/helmet and intercommunications (intercomm) jack for the jumpmaster are available, operational, and the intercomm extension cord is secured overhead (Figure 12-10).

(7) Safety harnesses and backpack-type parachutes are available for the jumpmaster and the crew chief, as required.

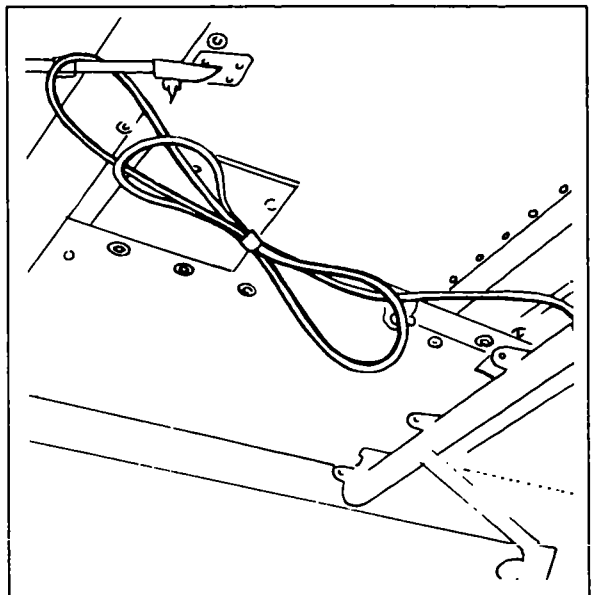
12-17. LOADING TECHNIQUES AND SEATING CONFIGURATION

Personnel are organized into a stick of eight parachutists and approach the aircraft from the left or right side in reverse order: Nos. 8, 7, 6, 5, 4, 3, 2, 1 (Figure 12-11).

WARNING: DO NOT APPROACH THE AIRCRAFT DIRECTLY FROM THE FRONT BECAUSE THE LOWEST ARC OF THE TURNING ROTOR BLADES OCCURS AT THAT POINT.

a. Parachutist No. 8, followed by Nos. 7, 6, and 5, enter the left door on command from the static jumpmaster. Nos. 4, 3, 2, and 1 enter the right door on command from the static jumpmaster. They are seated and hooked up by the jumpmaster in reverse numerical sequence, beginning with parachutist No. 8, as they enter the aircraft. The open portion of static line snap hooks face the front of the aircraft.

b. Parachutists Nos. 4 and 8 hold their static lines with a reverse bight; No. 4 with the right hand, and No. 8 with the left hand. The static lines of the



Extend the jumpmaster's intercommunication (INTERCOMM) cord to the rear, over the aft utility drain line, and tape the cord to the overhead troop seat support tube.

Figure 12-10. Jumpmaster's intercomm stowed overhead.

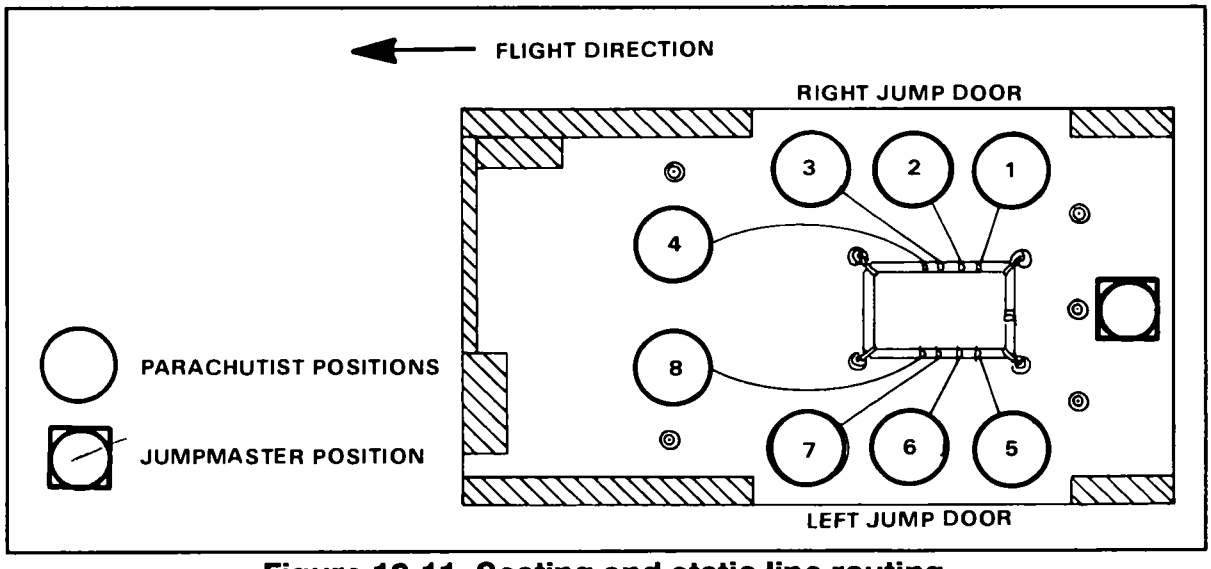


Figure 12-11. Seating and static line routing.

remaining parachutists, seated in the left and right doors, are routed directly behind them and down to the anchor line.

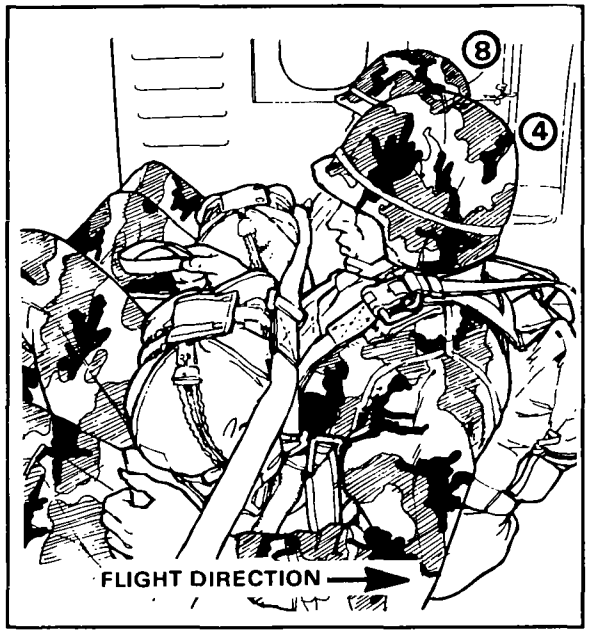


Figure 12-12. Nos. 4 and 8 with static line bight and safety belt secured.

c. The jumpmaster ensures that any excess static line is stowed on the parachutists, and that Nos. 4 and 8 have correctly routed their static lines with the proper reverse bight.

NOTE: To preclude binding during exit, excess static lines of parachutists No. 1, 2, 3, 5, 6, and 7 are stowed up through the static line slack retainer on the parachutist's backpack.

d. When the jumpmaster commands FASTEN SAFETY BELTS, parachutists do the following:

(1) Nos. 4 and 8 pass the running ends of their safety belt to the center, fasten the belt, and remove excess slack (Figure 12-12).

(2) Nos. 5 and 7 pass the running ends of their safety belt to No. 6 who fastens the belt and removes excess slack (Figure 12-13).

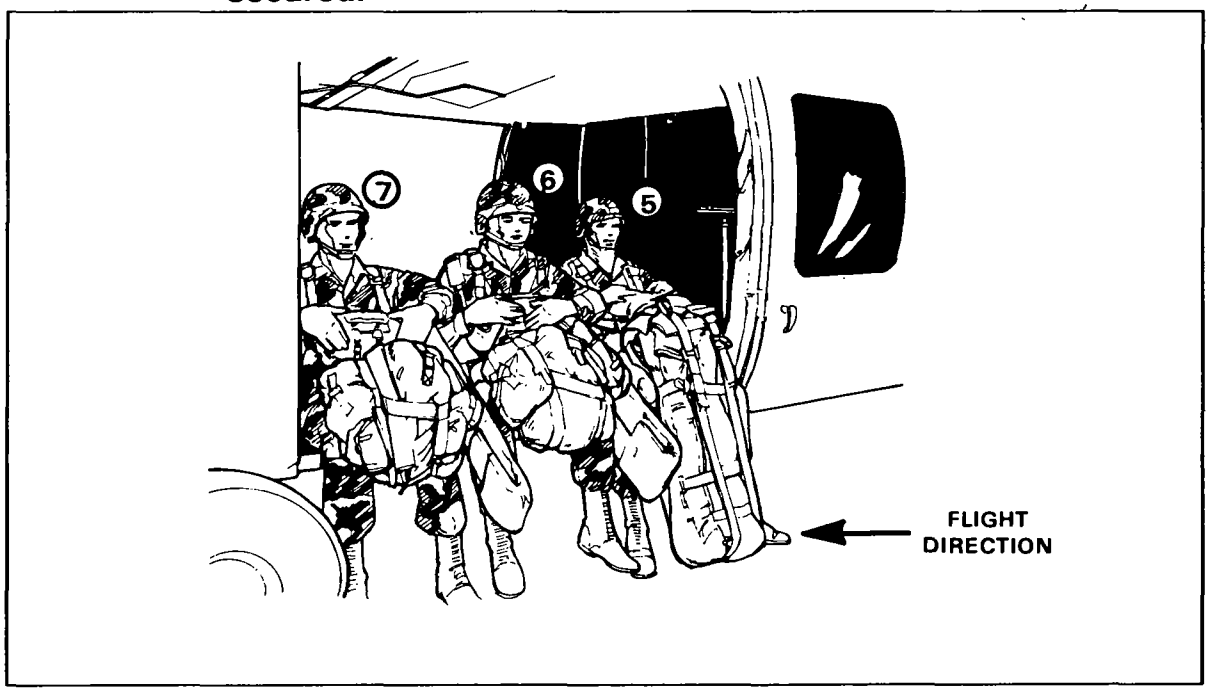


Figure 12-13. Parachutists (left door) with safety belt secured.

(3) Nos. 1 and 3 pass the running ends of their safety belt to No. 2 who fastens the belt and removes excess slack (Figure 12-14).

e. The jumpmaster inspects all safety belts to ensure that they are securely fastened and properly fitted. He is seated aft with his safety belt fastened for lift-off and landing. (One seat should have been left in place for the jumpmaster.)

f. For airdrop operations requiring the crew chief and window gunner (seat installed), the number of combat-equipped parachutists is reduced to six. The seating configuration is modified—positions 4 and 8 are deleted, and positions 5, 6, and 7 are renumbered 4, 5, and 6.

12-18. JUMP PROCEDURES

If the cargo doors are to be closed en route to the drop zone, the jumpmaster briefs Nos. 3 and 7 on door opening procedures before loading. At 6 minutes before the drop, the pilot either lands or brings the aircraft to a hover (near the ground) and notifies the jumpmaster to open the cargo doors. The jumpmaster directs Nos. 3 and 7 to open them. He ensures that the cargo doors are opened and locked. A 4-minute, a 30-second, and an 8- to 10-second warning are relayed to the jumpmaster by the pilot through the intercomm system.

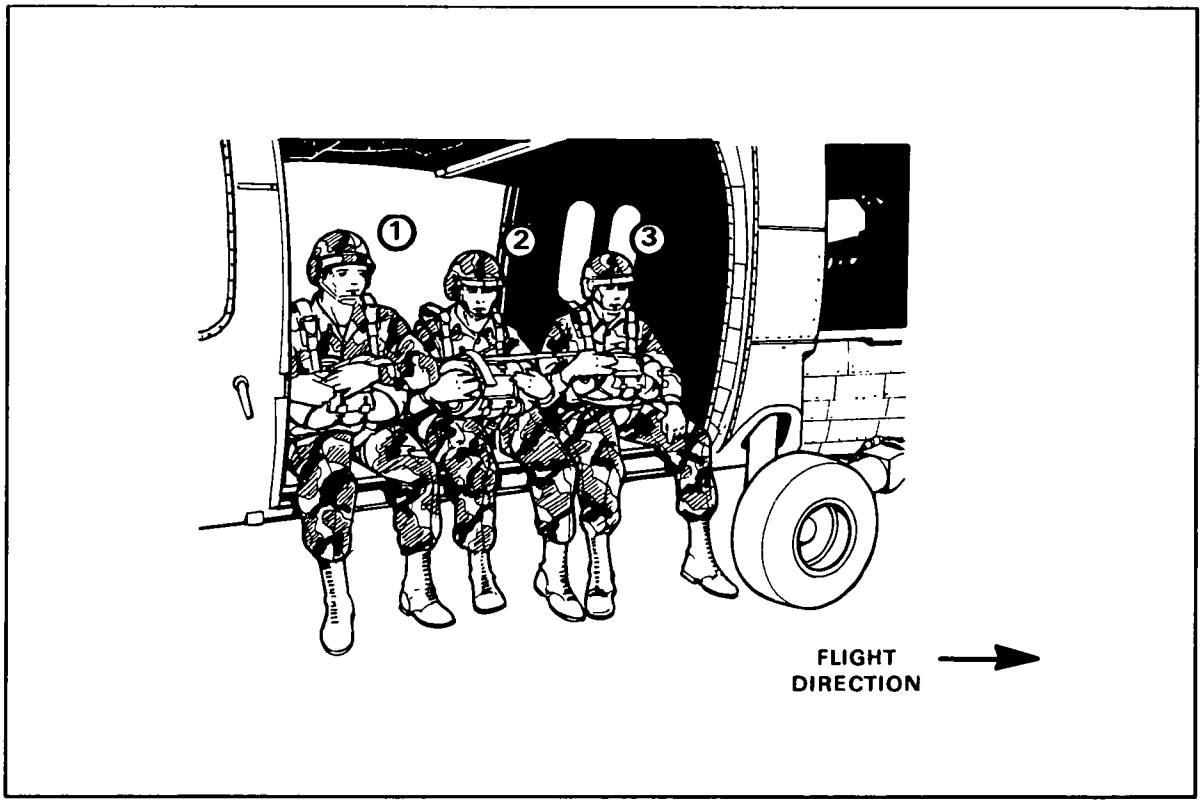


Figure 12-14. Parachutists (right door) with safety belt secured.

12-19. JUMP COMMANDS

The jumpmaster issues the following commands:

a. **GET READY.** This command is given at the 4-minute warning to alert the parachutists. All safety belts are removed.

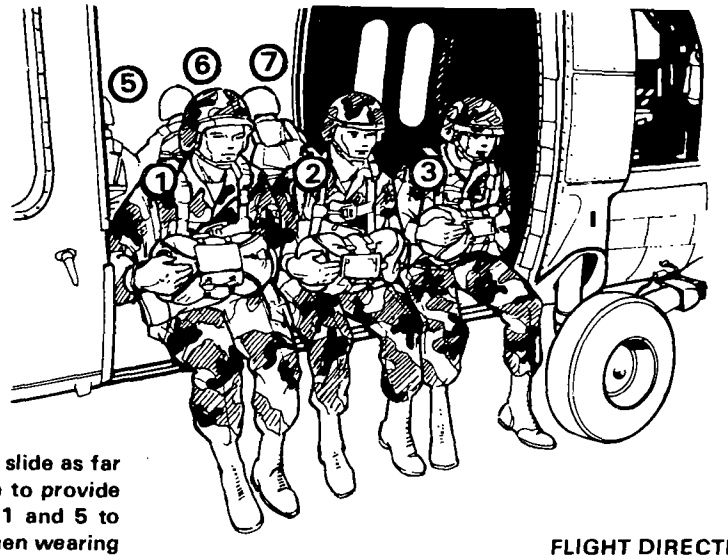
NOTE: Safety belts are removed when directed by the jumpmaster. They are released by Nos. 2, 6, and 8. The running ends are stowed forward and aft to clear the static lines and the exit path.

b. **CHECK STATIC LINES.** The jumpmaster checks the routing of all static lines (from backpacks to anchor cable) to ensure they are correctly routed and hooked up. He ensures excess static line is stowed up through the slack retainer on the backpacks of Nos. 1, 2, 3, 5, 6, and 7, and that Nos. 4 and 8 have the prescribed reverse bight in their static lines.

c. **CHECK EQUIPMENT.** All parachutists check their equipment.

d. **SOUND OFF FOR EQUIPMENT CHECK.** No. 1 indicates orally (and with a hand signal) to the jumpmaster the status of his equipment, followed by the remaining parachutists in numerical order.

e. **SIT IN THE DOOR.** This command is given by the jumpmaster at the 30-second warning. Nos. 1, 2, 3, 5, 6, and 7 assume door positions (Figure 12-15) with feet together outside the cargo compartment. Nos. 4 and 8 remain in place, ensuring that their



Nos. 2, 3, 6, and 7 slide as far forward as possible to provide clearance for Nos. 1 and 5 to exit, particularly when wearing combat equipment.

FLIGHT DIRECTION

Figure 12-15. Nos. 1, 2, 3, 5, 6, and 7 exit positions.

feet are clear of their static lines. (This command is omitted if the parachutists are already sitting in the door.)

f. **STAND BY.** This command is given at the 8-second to 10-second warning. The jumpmaster ensures that all parachutists hear and understand this command, particularly No. 1, who places both hands, palms down, on the cargo floor alongside the thighs and awaits the next command. Nos. 2, 3, 5, 6, and 7 place both hands, palms down, on the cargo floor and await the next command; Nos. 4 and 8 remain in place.

g. **GO.** The jumpmaster gives this command by an oral GO and a sharp tap on the rear of the parachutist's helmet. Each parachutist is tapped out. The jump sequence is in numerical order, 1 through 8. As soon as No. 3 clears the door, No. 4 moves into the door and assumes the door position before being tapped out. The static jumpmaster assumes control of the No. 4's static line as the parachutist begins moving to the door. The sequence is repeated in the left door by Nos. 5, 6, 7, and 8.

12-20. SAFETY

a. **Parachutists.** CWIEs are attached to Nos. 1 and or 5 parachutists. No more than two CWIEs, one for each door, can be jumped. DMJPs may not be jumped from aircraft that require the parachutists to sit on the floor. (Procedures for towed parachutists are in Chapter 2.) Crowded conditions inside the cargo compartment make accidental activation of the reserve parachute more likely. During movement inside the aircraft, the rip cord grip is guarded.

b. **Jumpmaster.** The static jumpmaster wears a safety harness that is attached to the aft cargo floor tie-down fitting (5B). Backpack-type parachutes may be used if a safety harness is not available. The jumpmaster is equipped with a headset or flight helmet that allows direct communications with the aircraft crew. The static jumpmaster immediately notifies the pilot of a towed parachutist.

c. **Equipment.** Equipment prescribed in Chapter 6 can be worn by parachutists when jumping this aircraft. Without detaching the static lines, the jumpmaster retrieves static lines and D-bags, places them inside an aviator's kit bag, and secures the kit bag until the aircraft has landed. The static line snap hooks are then removed from the anchor line attaching points. The UH-60A is not used for static line parachute operations with the cargo doors removed. The static line anchor line cable is never rigged to the cargo door or overhead tie-down rappelling rings since trailing D-bags might foul the main rotor system (due to the high position in which the bags would trail).

d. **Aircraft.** The indicated airdrop speed of the aircraft should not be less than 65 knots or more than 75 knots.

The minimum jump altitude is 1,500 feet (AGL).

NOTE: The pilot must maintain level flight and airdrop speed during D-bag retrieval to preclude D-bag entanglement with the cargo doors.

12-21. SAFETY BELT MODIFICATION

The UH-60A cargo compartment floor configuration does not provide a specific design of tie-down fittings for restraining personnel when personnel are seated on the cargo floor. The safety belts used for restraining personnel are part of the troop seat assembly and are removed when conducting parachute operations.

a. The three modified C-3A troop-type safety belts, using the cargo floor tie-down fittings, restrain parachutists in groups of two and three by a single safety belt (Figure 12-16).

b. Two safety belts, 112 inches long and adjustable to 86 inches, are used to restrain parachutists Nos. 1 through 3 and 5 through 7, who are seated in the left and right cargo doors.

c. One safety belt, 86 inches long and adjustable to 60 inches, is used to restrain Nos. 4 and 8 seated in the cargo compartment. Belt modifications are as follows:

(1) Place three standard C-3A troop-type safety belts (NSN 1670-00-447-9504) on a flat surface with hardware facing up.

(2) Remove the 8-inch lengths of webbing located between the end snap hooks and the quick-fit adapters of each belt.

(3) Cut two 32-inch and four 46-inch lengths of No. 3 nylon webbing and heat-sear the ends.

(4) Reassemble one belt using the two 32-inch lengths of webbing.

(5) Thread the running ends of the webbing up through the bar of the

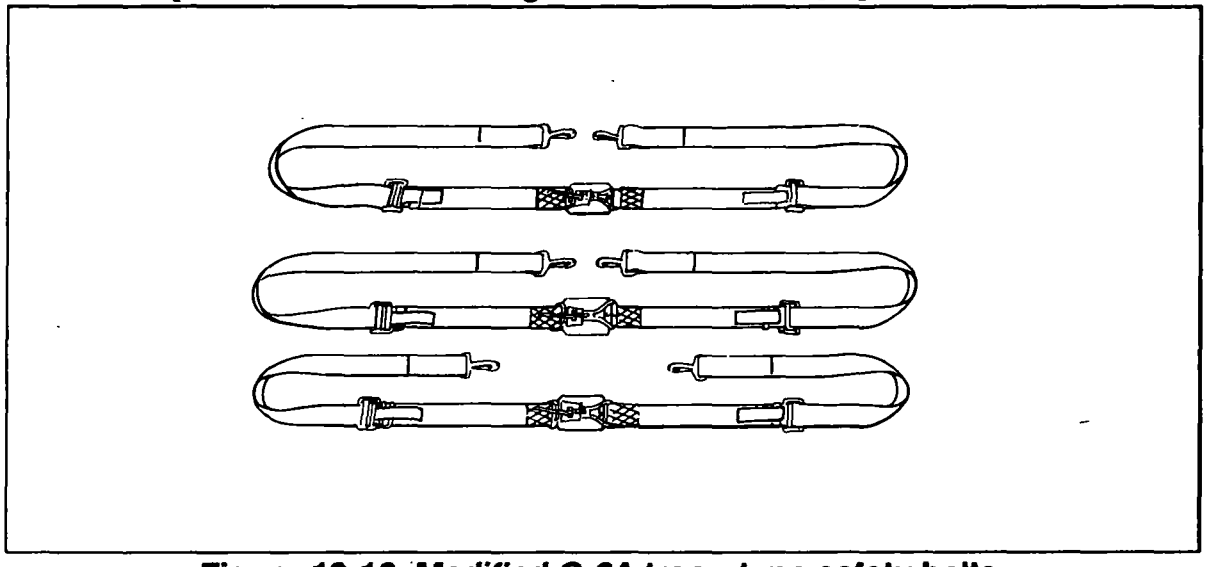


Figure 12-16. Modified C-3A troop-type safety belts.

snap hooks and quick-fit adapters. Make a 5-inch foldback and tack in place.

(6) Sew a 4-inch, 4-point, "WW" stitch formation on each foldback using No. 3 nylon thread and a medium-duty machine (TM 10-1670-240-20, Chapter 1, Section III).

(7) Reassemble the other two belts as indicated, using the 4-inch lengths of webbing.

Section IV. CH-47 CHINOOK

The CH-47 is a tandem-rotor, medium-transport helicopter. Twenty-eight combat-equipped parachutists can jump from this aircraft (Figure 12-17).

(1) Install safety belts for all parachutists and extend all the way out to ensure positive hookup while seated.

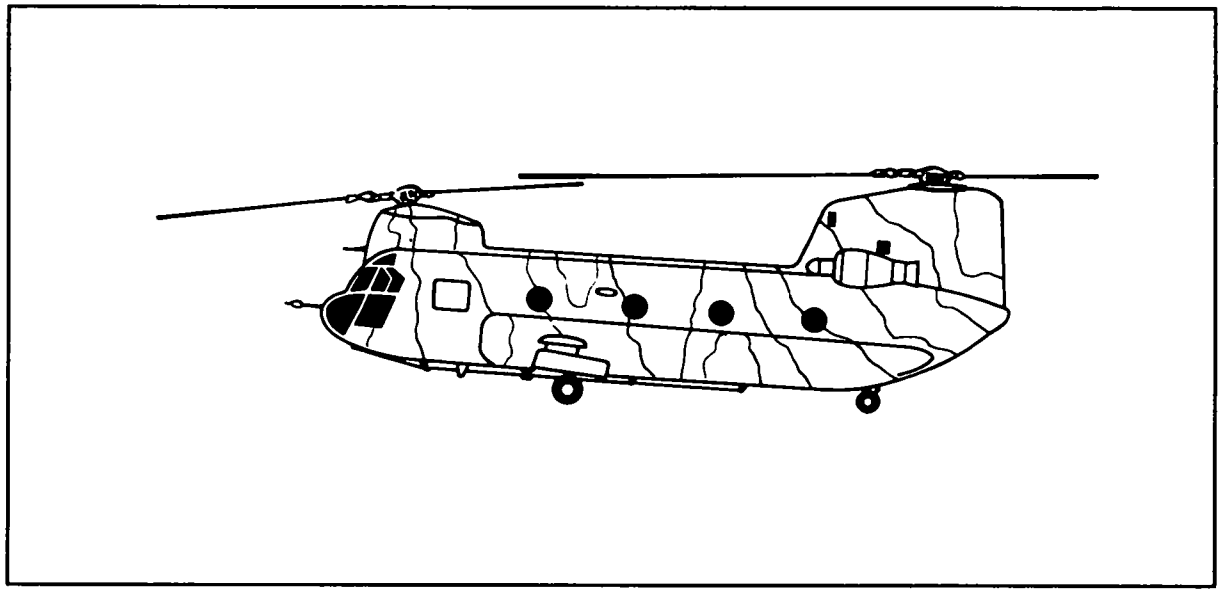


Figure 12-17. CH-47 Chinook.

12-22. PREPARATION AND INSPECTION

a. **Preparation.** The following steps prepare the CH-47 for jumping.

(2) Secure the permanently installed anchor line cable to the attachment points on the starboard side of the aircraft (Figure 12-18).

(3) Incline the ramp for personnel parachute drops during flight.

NOTE: The best incline is 3 degrees below the horizontal. Scribe marks may be placed on the ramp to show this degree of incline.

b. **Inspection.** Before enplaning, the jumpmaster and the pilot, or pilot's representative, jointly inspect the aircraft to determine the following:

(1) Troop seats can be easily lifted and secured before jumping.

(2) The ramp is clean and free of oil and water.

(3) Seats are securely fastened in the down position.

(4) The anchor line cable is not frayed or worn and is secured to the attachment points.

(5) The crew chief's headphones are available and function properly.

12-23. SEATING CONFIGURATION

The odd-numbered parachutists are seated on the starboard side, and the even-numbered parachutists are seated portside (Figure 12-19).

12-24. JUMP PROCEDURES

The 6-minute and 1-minute warnings are given by the pilot to the crew chief who in turn relays them orally and by to the jumpmaster by hand signals. If the jumpmaster jumps, he is the No. 1 parachutist; this requires a nonjumping safety to control the flow of parachutists.

12-25. JUMP COMMANDS

The jumpmaster issues the following commands:

a. **GET READY.** This command is given at the 4-minute warning to alert parachutists.

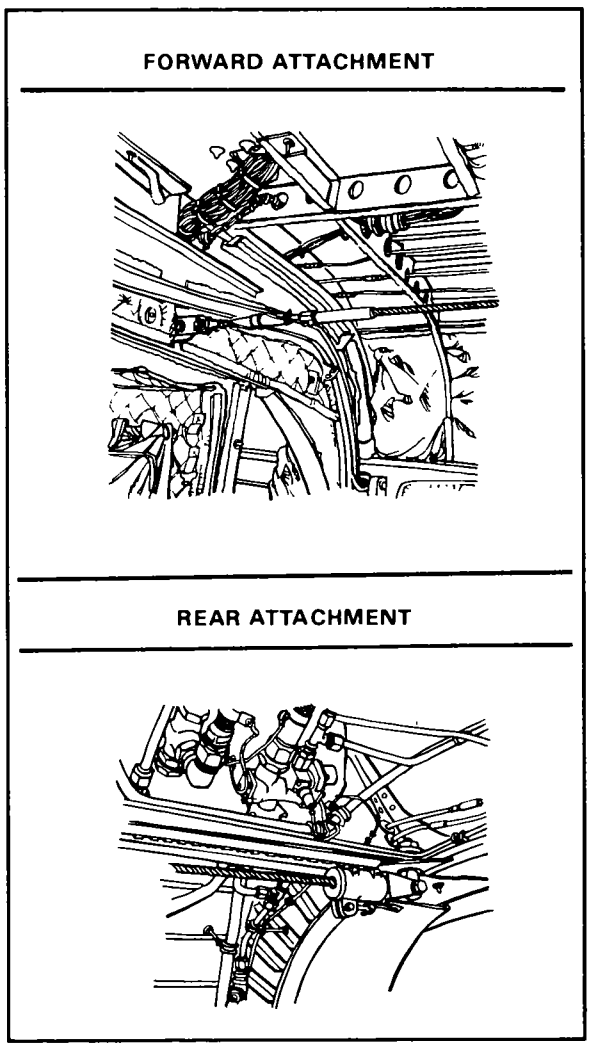


Figure 12-18. Anchor line cable attachment.

b. **PORTSIDE PERSONNEL, STAND UP.** Parachutists seated on the portside of the aircraft stand up and secure their seats in the up position.

c. **STARBOARD SIDE PERSONNEL, STAND UP.** Parachutists seated on the starboard side of the aircraft stand up and secure their seats in the up position.

d. **HOOK UP.** On this command, odd-numbered personnel hook up, followed by the even-numbered personnel, who hook up (the open portion of the snap hook facing starboard) between the odd-numbered personnel to form one continuous stick of 28 parachutists.

NOTE: After hooking up, the static line is controlled by each parachutist in a reverse bight at waist-level (left hand).

e. **CHECK STATIC LINES.** The jumpmaster or safety checks the routing of all static lines.

f. **CHECK EQUIPMENT.** All parachutists check their equipment.

g. **SOUND OFF FOR EQUIPMENT CHECK.** No. 1 indicates orally (and with a hand signal) to the jumpmaster the status of his equipment, followed by the remaining parachutists in numerical order.

h. **STAND BY.** The command is given 8 to 10 seconds before the command, GO. Parachutist No. 1 assumes a standing position at the ramp hinge

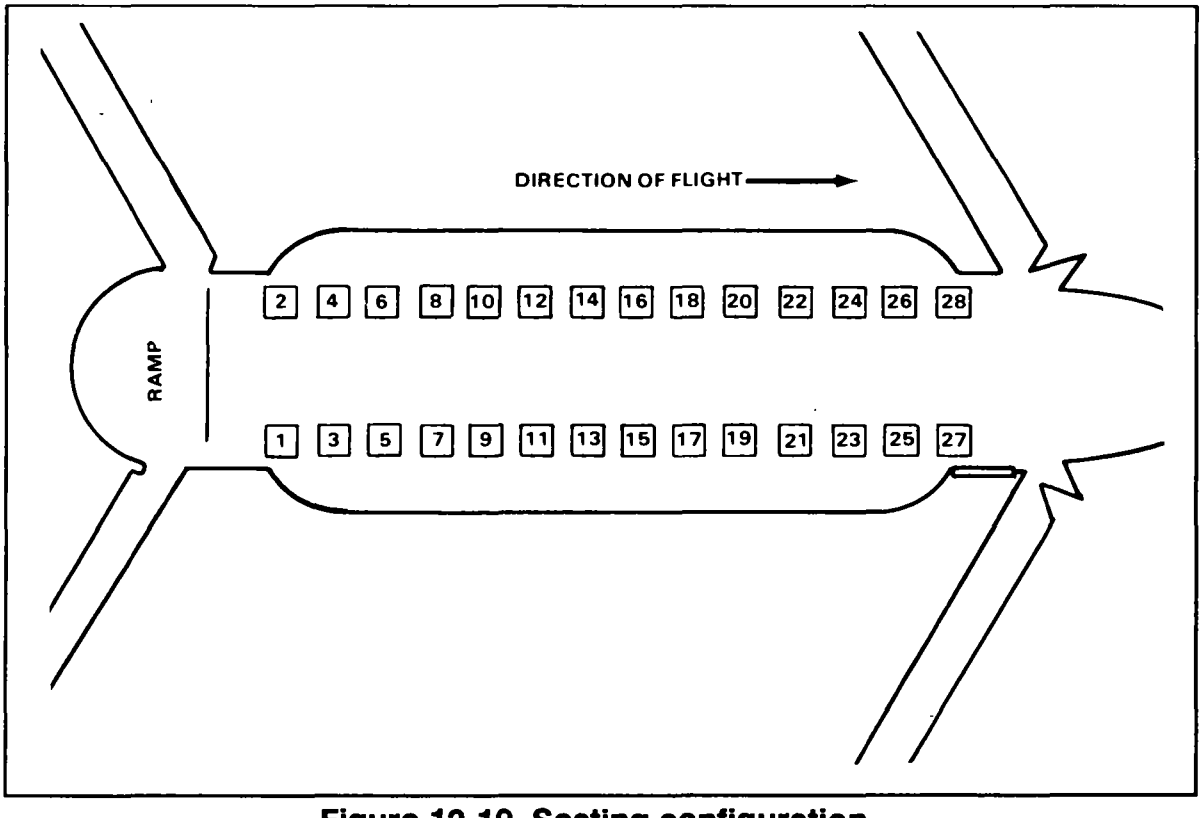


Figure 12-19. Seating configuration.

(near center) of the aircraft. The remaining personnel close up interval behind the first parachutist.

i. **GO.** No. 1 walks off the portside rear corner of the ramp. The remaining parachutists follow at 1-second intervals.

NOTE: The jumpmaster or safety controls the flow from his position on the port side near the ramp hinge. Less than a 1-second interval between parachutists may result in entanglement of parachutists and static lines.

12-26. SAFETY

a. **Parachutists.** Parachutists ensure that seats are secured in the up position with seat legs rotated inside the seats. When following internal drop loads, parachutists exit between the ramp roller conveyor sections, staying as close to the port-side section as possible. The parachutists jumping after external load drops, who are forward of the open floor hatch (used to check a load drop), remain clear of the opening until the load leaves the aircraft and the hatch is closed by the crew chief.

b. **Jumpmaster.** The jumpmaster or safety personnel ensure that parachutists are hooked up consecutively, 1 through 28 (Figure 12-20). If the jumpmaster does not jump, he wears a safety harness or back emergency parachute. He checks each

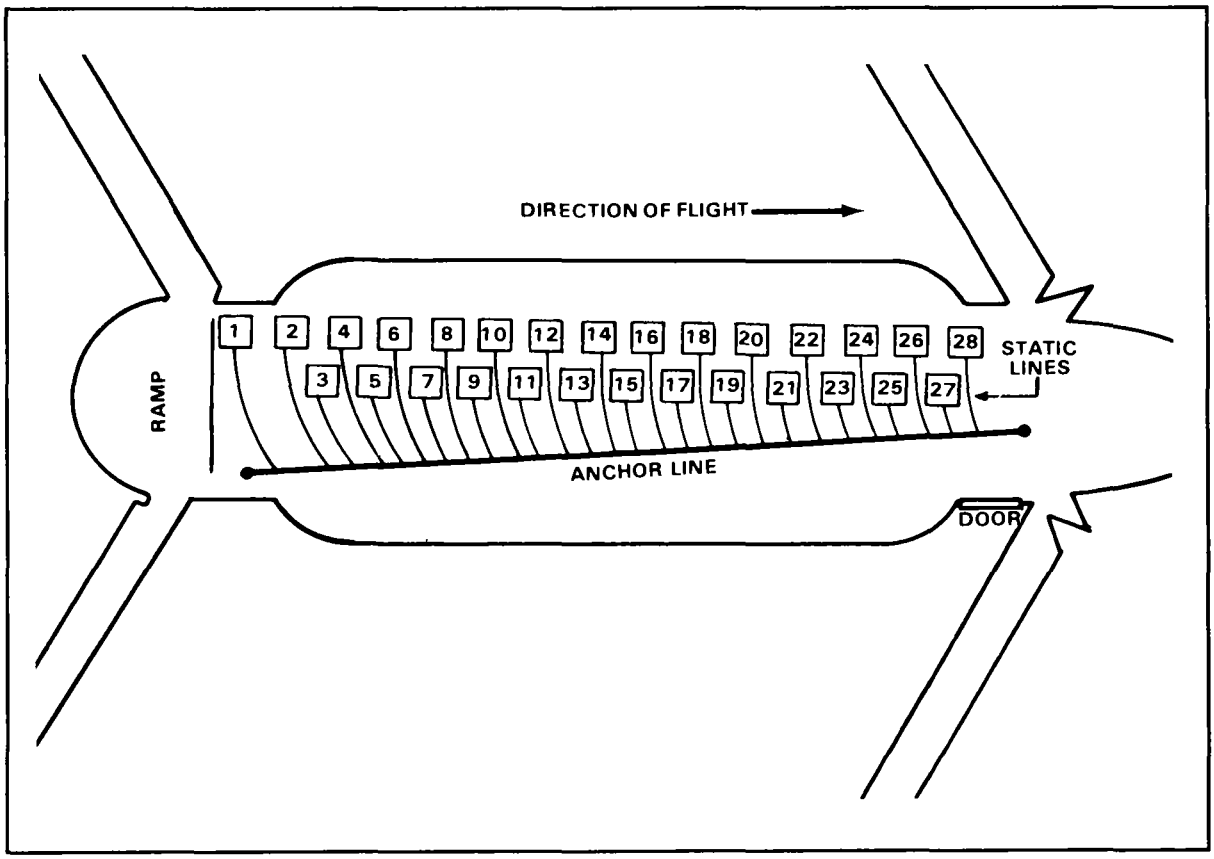


Figure 12-20. Static line routing.

parachutist after they hook up and controls the flow of parachutists. When an external load is delivered, the jumpmaster ensures the external load is clear and the aircraft has accelerated to a safe airdrop speed before dropping cargo bundles from inside the aircraft or permitting parachutists to exit.

c. **Equipment.** When cargo bundles are delivered, 15-foot breakaway static lines are used with cargo parachutes. The ramp roller conveyor section is installed on the starboard side of the ramp and is used to help eject the bundles from the cargo ramp; Nos. 1 and 2 push the bundles out.

d. **Aircraft.** Safety aboard the aircraft requires that the speed during jumps is not less than 80 knots or more than 110 knots. No special preparation is required if the aircraft has skis. Minimum jump altitude is 1,500 feet above ground level (unless the speed of the aircraft is 90 knots or greater). After the last parachutist has cleared the aircraft, the static lines are retrieved (using the static line retriever) inside the aircraft and secured in an aviator's kit bag.

Section V. CH-54 SKYCRANE (ARMY)

The CH-54 is a twin-turbine powered, heavy-lift helicopter. It is employed in the air transport of heavy or outsized equipment and supplies. It can be configured to carry cargo and personnel in a module (pod) that is attached to the aircraft by a four-point hookup system (Figure 12-21). The CH-54B universal military pod is a monocoupe structure with a rear-loading, split ramp, which extends the full

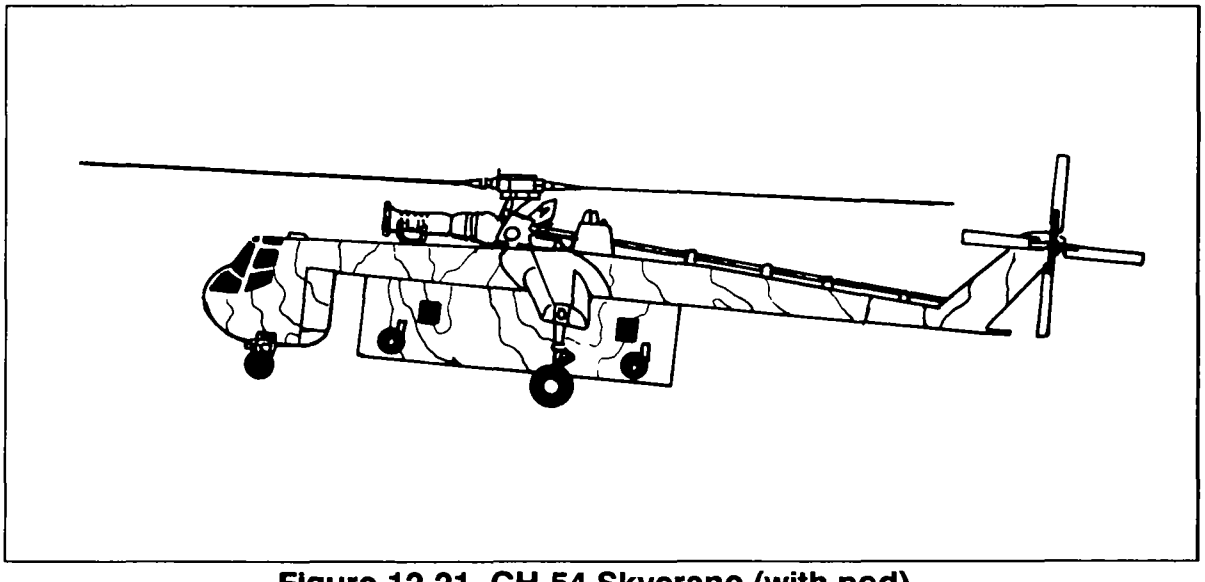


Figure 12-21. CH-54 Skycrane (with pod).

width and height of the pod. A small door is forward on each side, which is not used in jump operations. Twelve parachutists without combat equipment or ten parachutists with combat equipment can be delivered on one pass over the DZ. Twenty-four parachutists without combat equipment or twenty parachutists with combat equipment can be carried on one mission but must be divided into two or more smaller sticks requiring multiple passes over the DZ. One nonjumping (static) jumpmaster is required. Only the aft pod opening is used for parachuting.

12-27. PREPARATION AND INSPECTION

a. **Preparation.** The following steps prepare the CH-54 for jumping:

(1) Both rear loading ramps are removed.

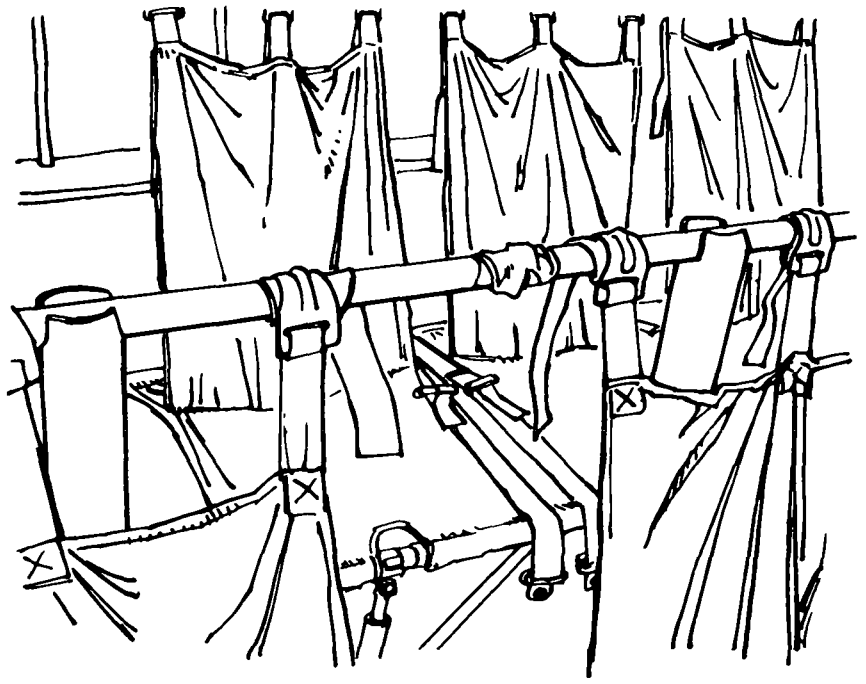


Figure 12-22. Horizontal supports taped.

(2) The seats are placed in two rows (12 seats each) facing starboard with the outboard seats on the portside of the pod and the inboard seats on the center line. The last three tie-down rings (Nos. 14A-E through 16A-E) are not used.

(3) The ends of the top horizontal supports on the back of the center row of seats are taped between each seat section to prevent items from becoming entangled in the seat back supports (Figure 12-22).

(4) An anchor line cable assembly is installed on the starboard side of the floor by using the two top tie-down fittings at the forward end (Nos. 1F and 2F) and the two tie-down fittings at the aft end (Nos. 15F and 16F) as attachment points. One 1/4-inch steel cable (MIL-C-5424 or MIL-C-1511), or 3/8-inch steel cable (MIL-W-12567), 29 feet long is used with six cable clamps, lock washers, and bolts. Two bolts with clamps face outboard and one bolt with clamps faces inboard. Wooden blocks are placed between the anchor line cable and the floor (Figure 12-23).

(5) The free ends of the cable, cable clamps, and inboard sides of the wooden blocks are taped.

(6) A 3-foot-wide section across the aft portion of the pod floor is coated with nonskid material

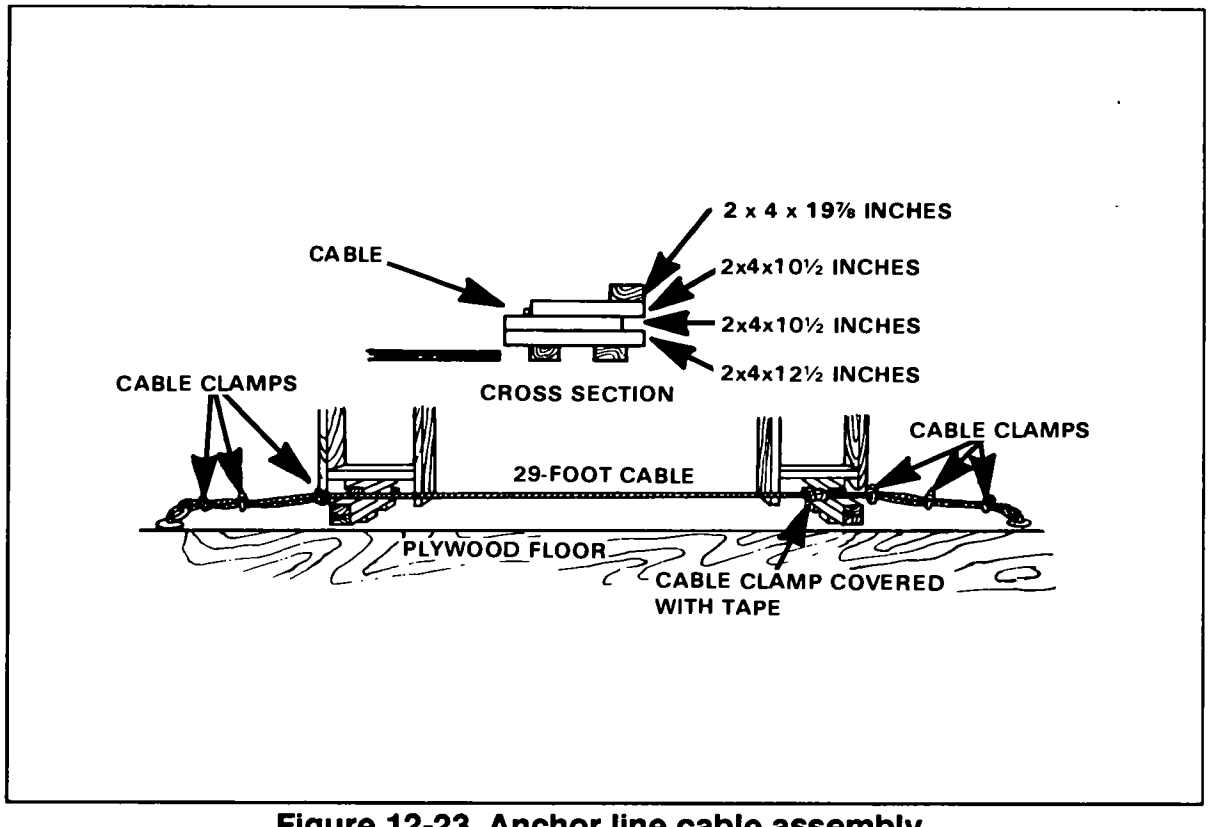


Figure 12-23. Anchor line cable assembly.

(Figure 12-24). An arrow 4 inches wide and 24 inches long is placed on the floor with white tape to indicate position and direction of exit.

(7) The safety gate is fabricated and installed at the aft end of the pod (Figure 12-25).

b. Inspection. Before enplaning, the jumpmaster and the pilot, or pilot's representative, jointly inspect the aircraft to determine the following:

(1) The pod is properly installed in a nonjettison configuration.

(2) All protruding edges or objects near the aft opening are removed or taped.

(3) The aft bottom edge and starboard corner of the pod opening are taped.

(4) Troop seats are secured, facing starboard, and the ends of the horizontal braces are taped together.

(5) A safety belt is available for each parachutist, and a safety harness is available for each nonparachutist.

(6) The edge of the cargo floor and starboard corner of the pod are taped.

(7) The floor is clean, not slippery, and there are no projections in the aisle.

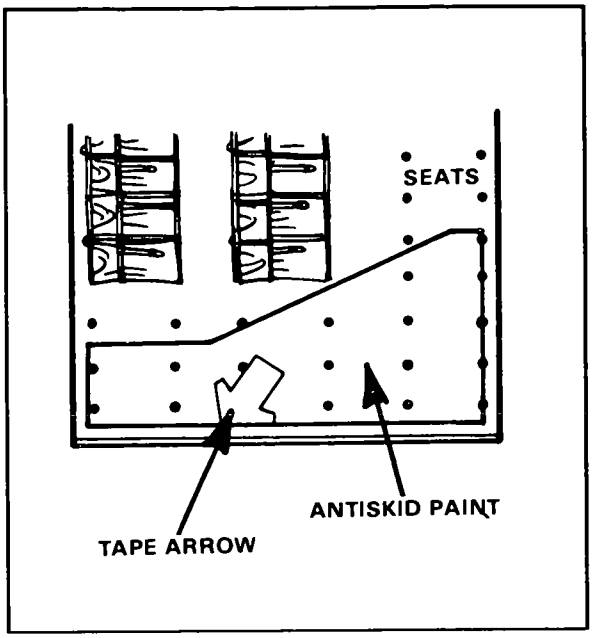


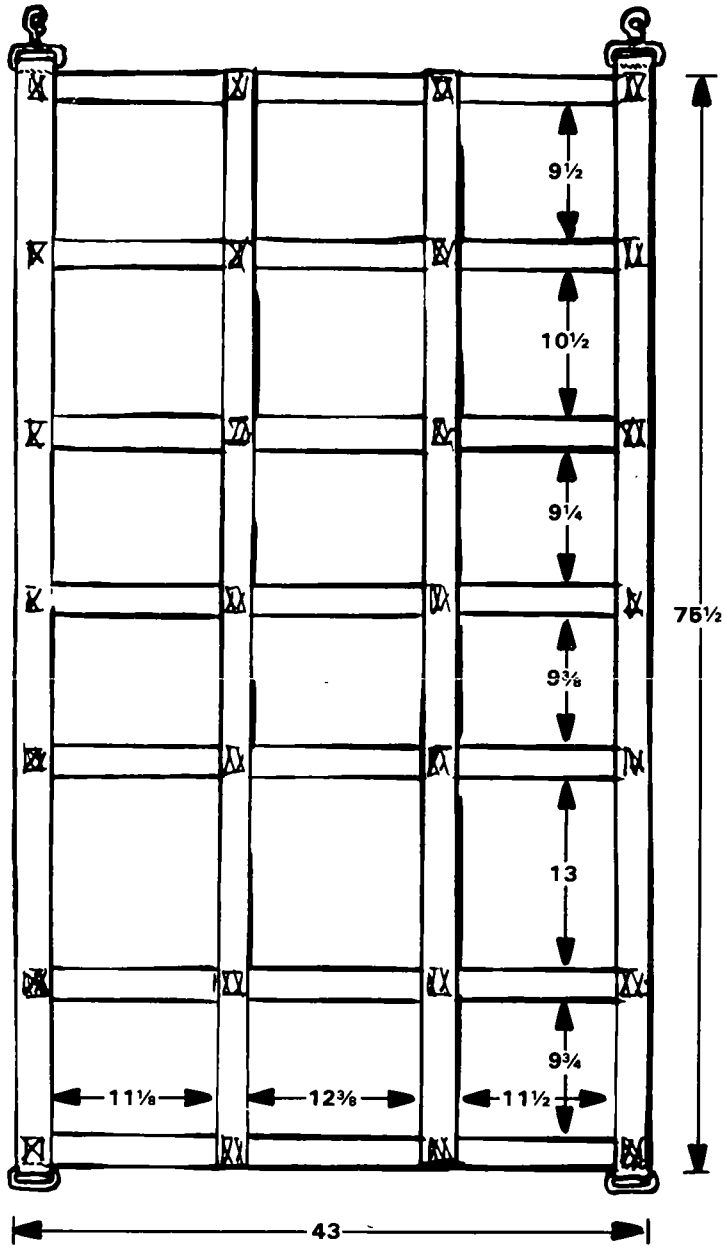
Figure 12-24. Nonskid paint.

(8) At least two sets of headphones are available (one set for the static jumpmaster) and function properly. The headphone cord for the static jumpmaster is long enough to let the jumpmaster look outside the pod at the aft port corner.

(9) For tactical night jumps, the two overhead lights at each end of the pod are turned on and have red lenses installed. All other lights are turned off, and the static jumpmaster and crew chief have flashlights with red lenses.

12-28. LOADING TECHNIQUES AND SEATING CONFIGURATION

A maximum of 20 combat-equipped parachutists are seated in two rows of seats, 10 inboard and 10 outboard. All



Two eech pieces of Type VIII nylon webbing, 87½ inches long.

Two each pieces of Type VIII nylon webbing, 74¼ inches long.

Two eech pieces of Type VIII nylon webbing, 36 inches long.

Seven each pieces of Type VIII nylon webbing, 43 inches long.

Four each snaps, pert No. MS22044-1.

Two eech edapter quick-fit, pert No. MS2207-1.

Mechine, sewing, 11W155.

Webbing, nylon, Type VIII, 1 23/37 inches wide, FSN 8305-361-8585.

Threed, nylon, size FF, FSN 8310-227-1244.

Stitch formations, four point WW, 4 inches long.

Figure 12-25. Material needed for safety gate.

parachutists load from the aft opening on the starboard side of the pod. Parachutists have the static line over the left shoulder and load in reverse order with the second stick (Nos. 11 through 20) moving on the starboard side of the pod to the forward end of the pod and back down the aisle in front of the port seats. The first stick also loads on the starboard side (Figure 12-26).

a. Parachutists equipped with the CWIE are positioned in the first stick (Nos. 1 through 10).

b. When air delivery containers are part of the internal load, they are stowed in the aft center of the pod inside the safety gate. Air delivery containers reduce the number of parachutists who may be carried, depending on the size and number of containers.

c. When all parachutists are inside the pod, the second stick sits down and fastens seat belts, and the first stick hooks up (with the open gate of the snap hook down) and then sits down and fastens seat belts. The static jumpmaster ensures that all snap hook safety wires are inserted and that the static lines are properly routed. He then moves to the port aft corner of the pod, secures the gate, and secures the safety harness.

12-29. JUMP PROCEDURES

The pilot gives the 4-minute warning to the static jumpmaster, who relays it by hand signals to the first stick.

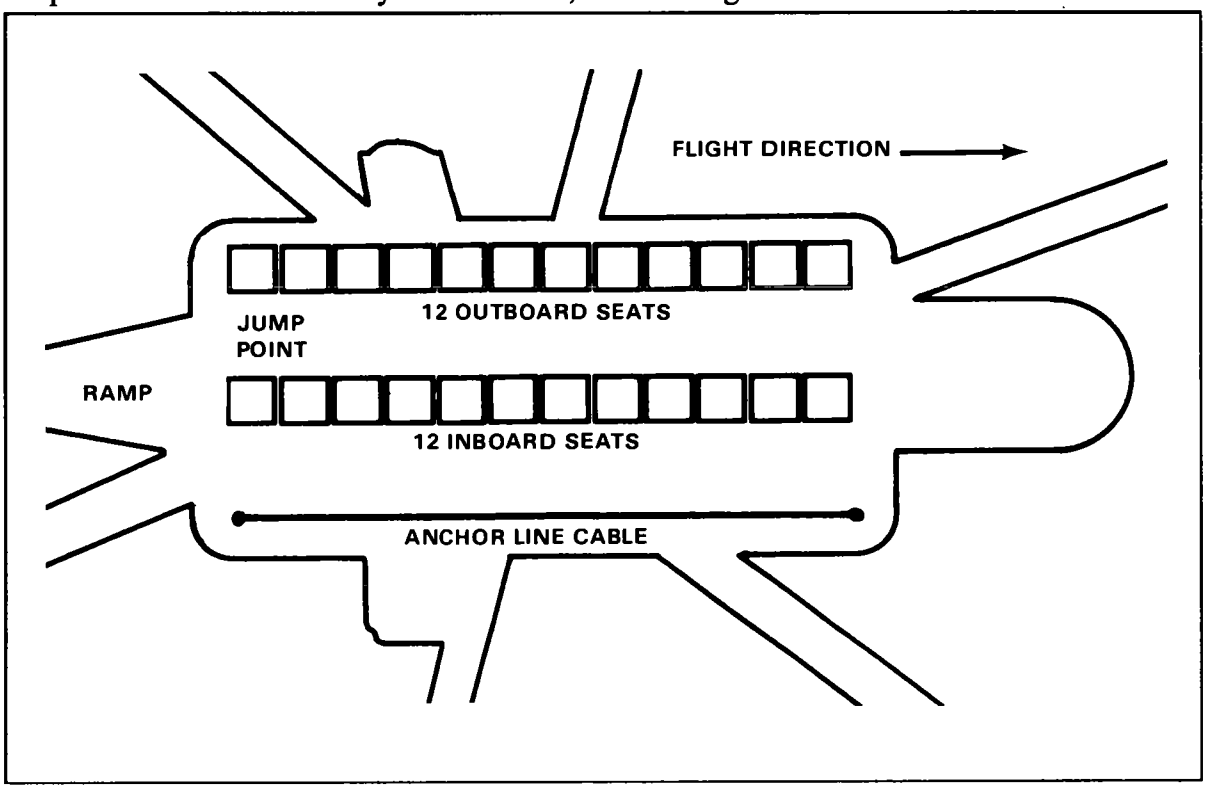


Figure 12-26. Seating configuration.

12-30. JUMP COMMANDS

At the 4-minute warning, the safety gate is removed by the aft crew chief or static jumpmaster, who then checks to see that the tail skid is in the raised position (Figure 12-27).

a. **GET READY.** All parachutists in the first stick unfasten their seat belts.

b. **INBOARD PERSONNEL, STAND UP.** Parachutists in the center row stand up, face aft, and take a reverse bight (at waist level) with the left hand on the static line.

c. **CHECK STATIC LINES.** All parachutists check the routing of the static line of the parachutist to their front to ensure that it is not routed to the right side of the parachute pack. Parachutists Nos. 9 and 10 pivot forward to the right so that the static line of the last parachutist can be checked by parachutist No. 9.

d. **CHECK EQUIPMENT.** All parachutists check their equipment.

e. **SOUND OFF FOR EQUIPMENT CHECK.** No. 1 indicates orally (and with a hand signal) to the jumpmaster the status of his equipment, followed by the remaining parachutists in numerical order.

f. **STAND BY.** The No. 1 parachutist takes a position aft of the center row of seats with feet apart, the right foot on line with the arrow on the floor.

g. **GO.** Using hand (finger) signals, the static jumpmaster initiates the 5-second countdown to the No. 1 parachutist, who walks off the aft end of the pod (along the arrow at a 45-degree angle to the rear of the pod), releasing the static line as it is pulled

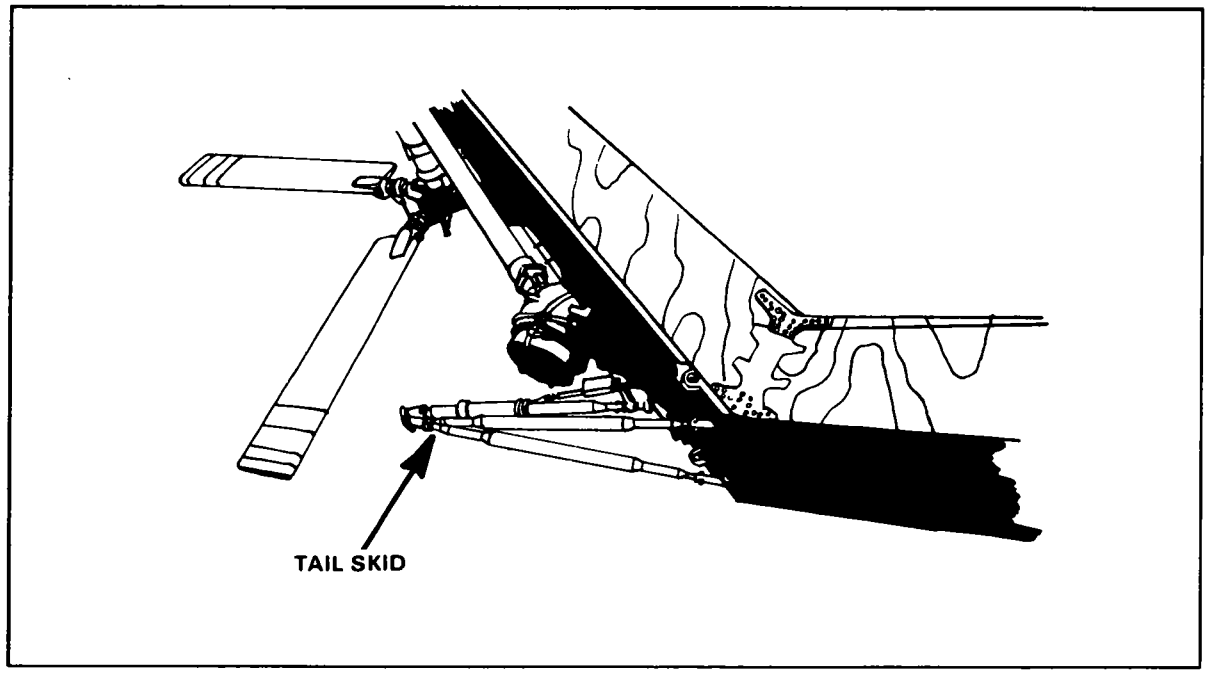


Figure 12-27. Tail skid raised.

by the anchor line cable. When air delivery containers are being dropped, the static jumpmaster ensures that the load is free before giving the GO signal to No. 1. The load is pushed out by the No. 1 parachutist or aft crew chief. After the last parachutist from the first stick exits the aircraft, the aft crew chief or static jumpmaster closes the safety gate. The static jumpmaster then gives the following commands to the second stick:

(1) GET READY. All parachutists remove seat belts.

(2) STAND UP. Parachutists stand and move around the forward end of the pod and back along the anchor line cable. When parachutist No. 20 is aligned along the cable, the next command is given.

WARNINGPARACHUTISTS KEEP THEIR RIGHT HAND OVER THE RESERVE RIP CORD GRIP WHEN MOVING INSIDE THE POD.

(3) HOOK UP AND SIT DOWN. All parachutists hook up and sit down in the center row of seats. The static jumpmaster then checks the static line of each parachutist, moving from the forward end of the pod aft. He ensures that the snap hook is securely attached to the anchor line cable, the safety wire is inserted, and the static line is routed to the parachute pack on the left side of the parachutist. Then, the static jumpmaster's safety harness is secured to the proper aft tie-down ring, and the jumpmaster opens the safety gate. The remaining jump commands are the same as those for the first stick. Procedures are the same when jumping 12-parachutist sticks without combat equipment.

12-31. SAFETY

a. **Parachutists.** Parachutists are cautioned to watch the static line of the parachutist in front and to observe the equipment lowering line and parachute static line when near the seat corners. Parachutists do not exit the pod until the deployment bag of the preceding parachutist has trailed to the starboard side of the aircraft. The minimum time between parachutists is two seconds. The minimum time between the first and second stick of parachutists is four minutes during the day and six minutes at night.

b. **Jumpmaster.** The static jumpmaster controls the interval between parachutists. When necessary, one individual may perform the duties of both the static and the parachuting jumpmaster; in this instance, the jumpmaster is the last parachutist to exit the pod.

c. **Equipment.** When cargo bundles are delivered, 15-foot breakaway static lines are used with cargo parachutes. All personnel inside the CH-54 pod

wear protective hearing equipment when the ramp doors are removed. When there are less than 10 parachutists to a stick, the deployment bags are retrieved before the CH-54 makes any turning maneuvers.

d. **Aircraft**. The optimum indicated airspeed of the the CH-54 with pod during static line parachute operations is 70 knots, but not less than 65 knots or more than 75 knots. The pilot must raise the tail skid no later than the 4-minute warning. When there are two crew chiefs in the pod, one is at each end of the pod. The forward (side) doors remain closed when the ramp doors are removed. This prevents carbon monoxide and exhaust fumes from entering the pod and permits the deployment bags to trail properly. The minimum drop altitude is 1,500 feet AGL.

CHAPTER 13

OTHER SERVICE AIRCRAFT

Other service rotary-wing aircraft are used for parachuting operations. In addition to the procedures discussed herein, Chapter 12, Section I, also applies.

Section I. CH-53 SEA STALLION (USMC)

The CH-53 is a twin-engine, single-rotor, medium-transport helicopter. Twenty combat-equipped parachutists, using the ramp, can jump from this aircraft (Figure 13-1).

13-1. PREPARATION AND INSPECTION

a. **Preparation.** The following procedures prepare the CH-53 for jumping:

(1) Install the anchor line cable on the portside of the floor using the tie-down fittings at station No. 182

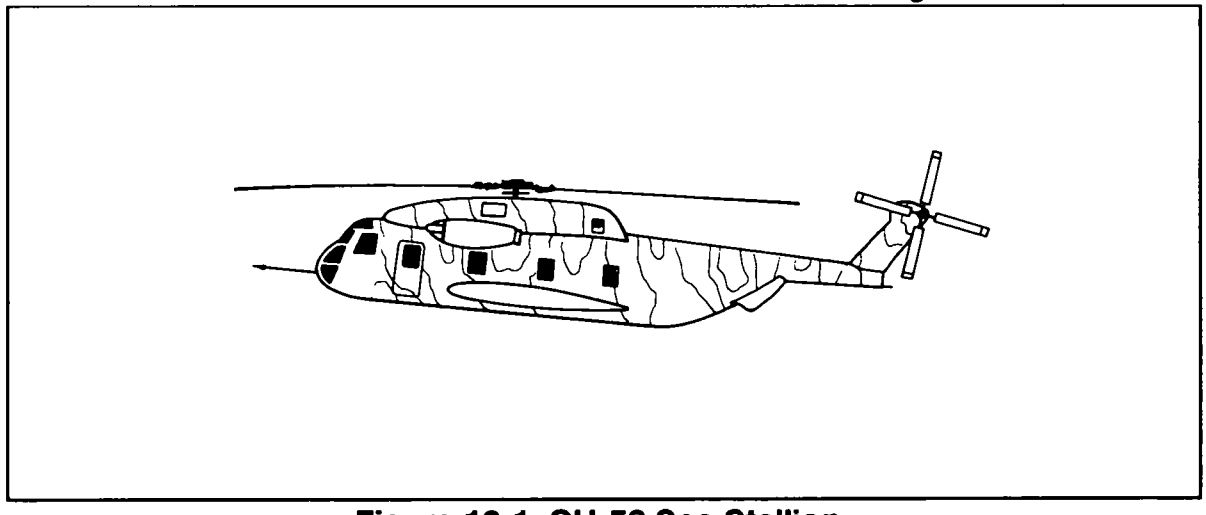


Figure 13-1. CH-53 Sea Stallion.

as the forward attachment point, and station No. 522 as the rear attachment point (Figure 13-2).

(2) Use one 1/4-inch or 3/8-inch steel cable, 30 feet 4 inches in length, with four clamps, lock washers, and bolts.

(3) Place two 4- by 4- by 6-inch wooden blocks between the anchor line cable and floor, and attach a clevis assembly (G-13) to the tie-down ring at station No. 502 for use as a static line snap hook stop.

(4) Remove excess slack from the anchor line.

(5) Turn over and secure the conveyor rollers in the down position with the smooth surface up.

(6) Ensure that a 5-foot static line extension (FSN 1670-368-4225) is available.

b. **Inspection**. Before enplaning, the jumpmaster and pilot, or pilot's representative, jointly inspect the aircraft to determine the following:

(1) Safety belts are installed for all parachutists and extended all the way out to ensure positive hookup while seated.

(2) Seats are fastened securely in the down position.

(3) Seats are lifted and secured before jumping.

(4) The anchor line cable is not worn or frayed and is secured to the

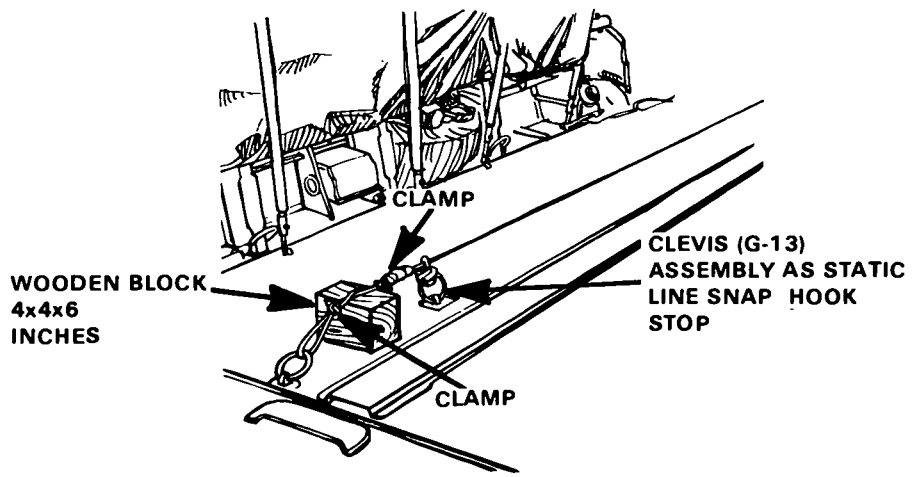


Figure 13-2. Anchor line installation.

attachment points in the prescribed manner.

(5) The ramp and deck are clean and free of oil and water.

(6) All protruding objects near the ramp are removed or taped.

(7) The crew chief's headphones are available and function properly.

13-2. LOADING TECHNIQUES AND SEATING CONFIGURATION

Parachutists enter the aircraft over the ramp with the static line over the right shoulder. Odd-numbered parachutists are seated on the portside and even-numbered parachutists are seated on the starboard side (Figure 13-3).

13-3. JUMP COMMANDS AND PROCEDURES

a. The 6-minute and 1-minute warnings are given by the pilot to the crew chief, who in turn relays them orally and by hand signals to the jumpmaster.

(1) GET READY. All parachutists remove seat belts.

(2) STAND UP. All parachutists stand up and secure their seats in the up position.

(3) PORTSIDE PERSONNEL, HOOK UP. Odd-numbered

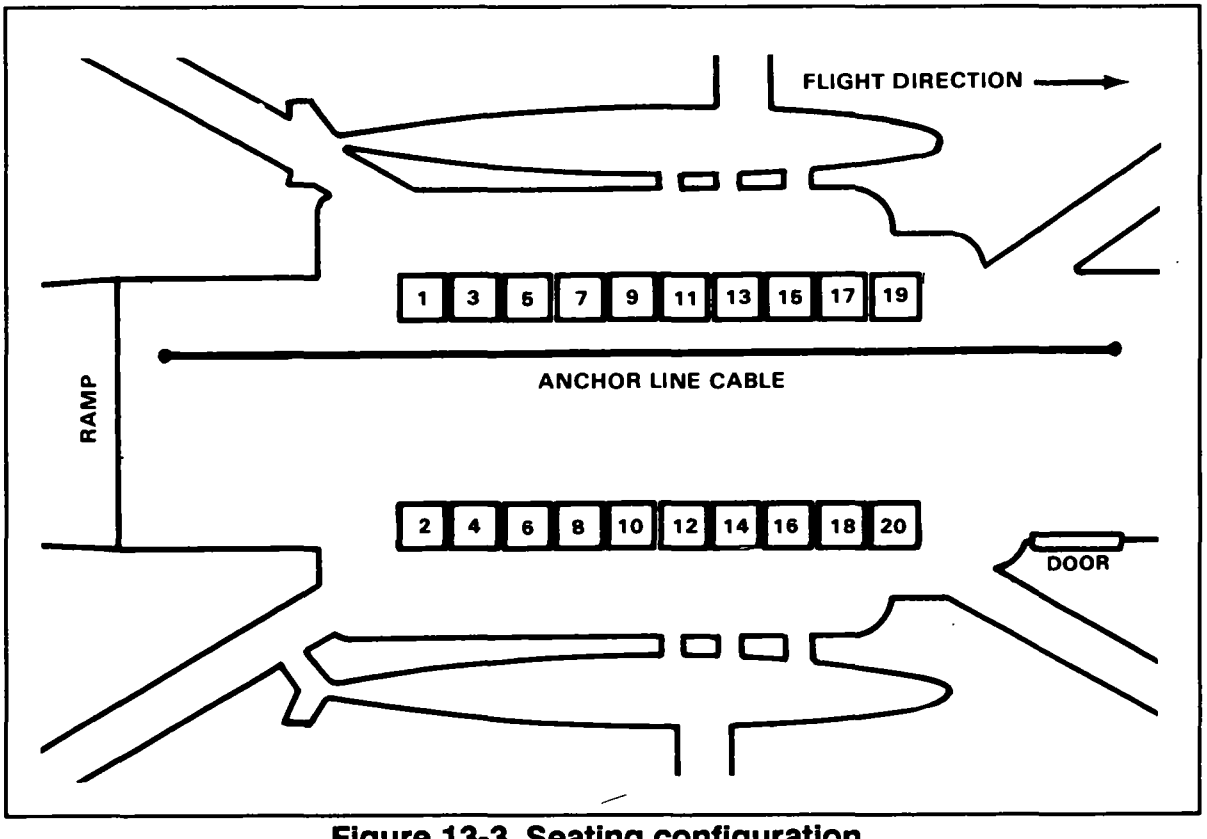


Figure 13-3. Seating configuration.

parachutists kneel and hook up (with the open portion of the static line snap hook facing inboard) and return to the standing position (Figure 13-4).

(4) STARBOARD SIDE PERSONNEL, HOOK UP. Even-numbered parachutists kneel and hook up (with the open portion of the static line snap hook facing inboard) between odd-numbered personnel and return to the standing position to form one continuous stick of 20 parachutists. All parachutists control their static line with a reverse bight (at waist level) in the right hand.

(5) CHECK STATIC LINES. All parachutists check the routing of the static line of the parachutist to their front to ensure that it is not misrouted. Parachutists Nos. 19 and 20 turn so that the static line of the last parachutist can be checked by parachutist No. 19.

(6) CHECK EQUIPMENT. All parachutists check their equipment.

(7) SOUND OFF FOR EQUIPMENT CHECK.

(8) STAND BY. No. 1 assumes a standing position at the ramp hinge. The remaining personnel close up

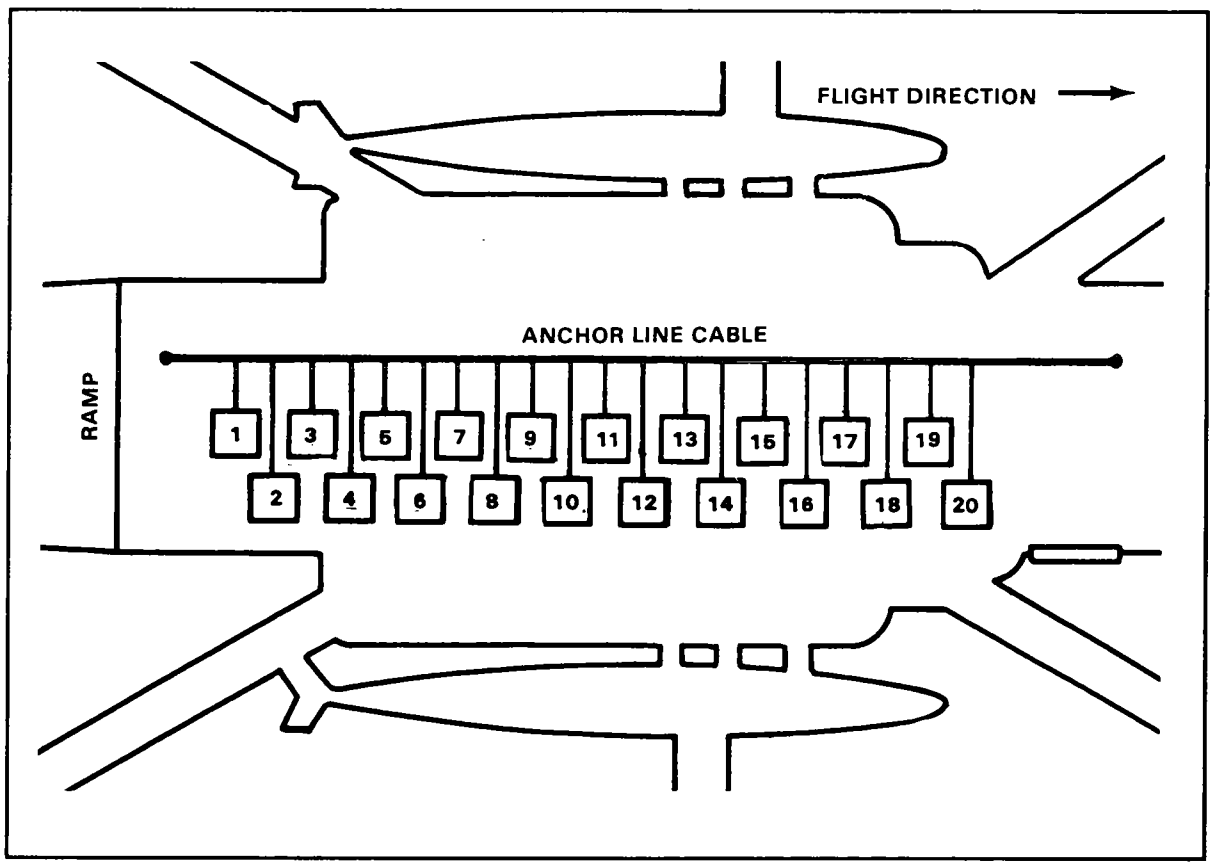


Figure 13-4. Static line routing.

intervals behind the first parachutist.

(9) GO. No. 1 walks off the starboard rear corner of the ramp. The remaining parachutists follow at 1-second intervals.

WARNING: PARACHUTISTS WALK OFF THE RAMP (WHICH IS LOWERED 11 DEGREES BELOW CENTER LINE GAGE). PARACHUTISTS DO NOT MAKE A VIGOROUS EXIT. LESS THAN A 1-SECOND INTERVAL BETWEEN PARACHUTISTS MAY RESULT IN ENTANGLEMENT OF PARACHUTISTS AND STATIC LINES.

b. Upon exit of all parachutists, the crew chief or static jumpmaster recovers all static lines.

13-4. SAFETY

No more than two parachutist should jump with CWIE in one pass over the DZ. These parachutists should be Nos. 1 and 2 in the stick. The static jumpmaster or safety personnel ensure that parachutists are hooked up consecutively (1 through 20), and that all seats are secured in the up position. The speed of the aircraft during jumps is 80 knots. The minimum drop altitude is 1,500 AGL.

Section II. CH-46 SEA KNIGHT (USMC)

The CH-46 is a tandem-rotor, medium-transport helicopter. Twelve combat-equipped parachutists can jump from either the personnel door or the ramp (Figure 13-5).

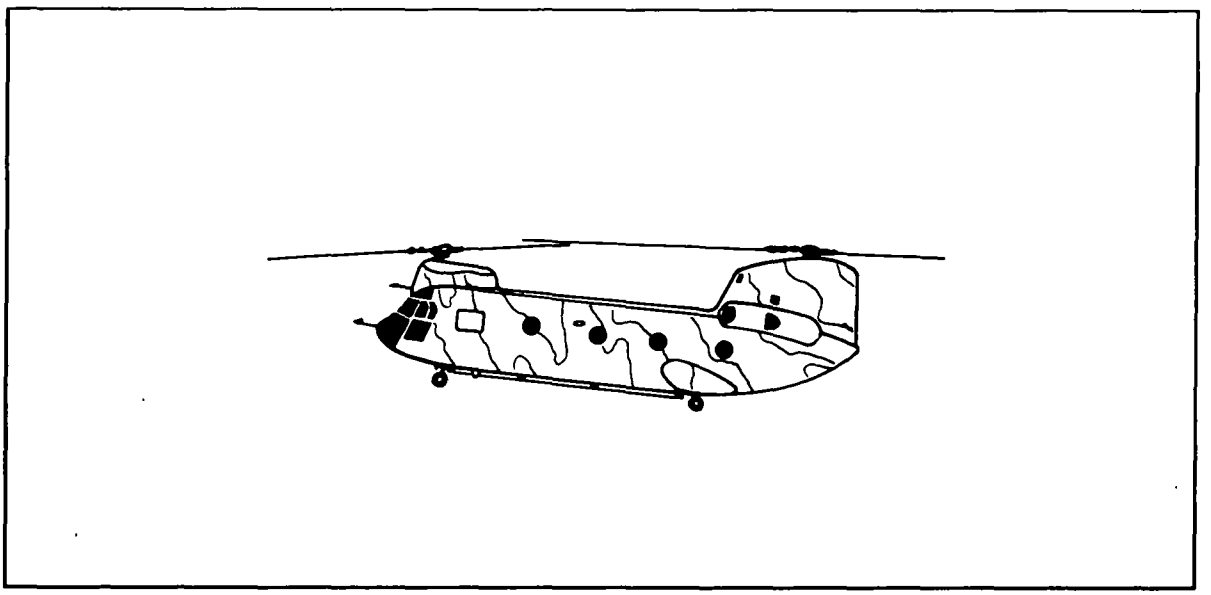


Figure 13-5. CH-46 Sea Knight.

13-5. PREPARATION AND INSPECTION

a. **Preparation**. The following procedures prepare the CH-46 for jumping:

(1) The anchor line cable is installed on the floor of the aircraft on the starboard side using the tie-down fittings at station No. 170 as the forward attachment point, and station No. 410 as the rear attachment point (Figure 13-6).

(2) One 1/4-inch or 3/8-inch steel cable, 260 inches in length, is installed with four clamps, lock washers, and bolts.

(3) Two 2- by 4- by 6-inch wooden blocks are placed between the anchor line cable and floor, and a clevis assembly (G-13, for use as a static line snap hook stop) is attached to the tie-down ring at station No. 190 (door jump).

(4) Excess slack is removed from the anchor line cable.

(5) The personnel door is removed, and a plywood cover is installed over the aft side of the door frame and secured with a metal plate. The bottom and aft edges of the door frame are padded and taped (Figure 13-7).

(6) When jumping from the ramp, the anchor line cable is installed as described previously except that it is on the portside and the G-13 clevis (for the static line snap hook stop) is on the tie-down ring at station No. 390.

(7) A 5-foot static line extension (FSN 1670-368-4225) is required.

b. **Inspection**. Before enplaning, the jumpmaster and pilot, or pilot's representative, jointly inspect the aircraft to determine the following:

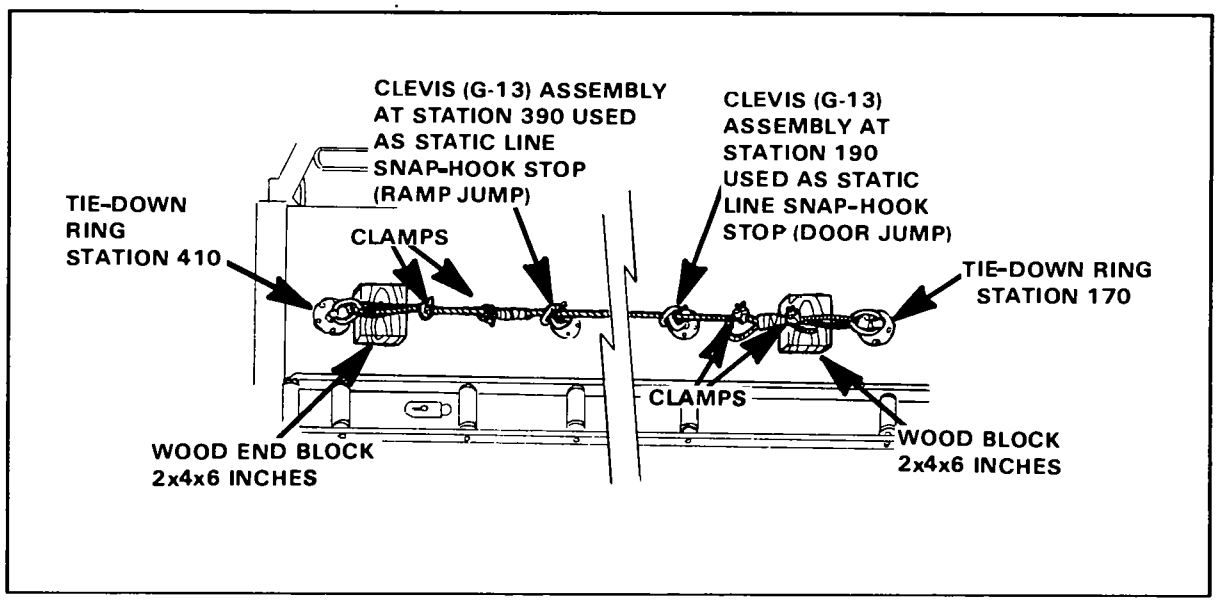

CLEVIS (G-13) ASSEMBLY AT STATION 390 USED AS STATIC LINE SNAP-HOOK STOP (RAMP JUMP)
CLEVIS (G-13) ASSEMBLY AT STATION 190 USED AS STATIC LINE SNAP-HOOK STOP (DOOR JUMP)
TIE-DOWN RING STATION 410
CLAMPS
TIE-DOWN RING STATION 170
CLAMPS
WOOD END BLOCK 2x4x6 INCHES
WOOD BLOCK 2x4x6 INCHES

Figure 13-6. Anchor line cable installation.

(1) Seat belts are installed for all parachutists and extended all the way out to ensure positive hookup while seated.

(2) Seats are fastened securely in the down position.

(3) Seats can be lifted and secured before jumping.

(4) The anchor line cable is not worn or frayed and is secured to the attachment points in the prescribed manner.

(5) The wooden cover is installed and secured to the aft edge of the door frame when jumping the personnel door.

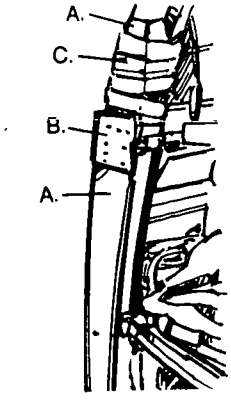
(6) The bottom edges of the door frame are properly padded and taped.

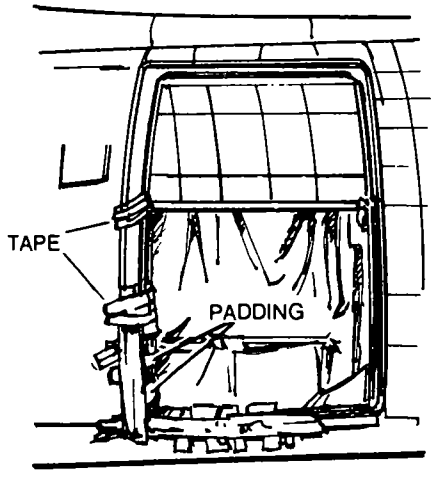
(7) The ramp and deck are clean and free of oil or water.

A. WOODEN COVER:
1/4-INCH PLYWOOD
LENGTH, 44 INCHES
WIDTH
(TOP) 3 INCHES
(MIDDLE) 5 INCHES
(BOTTOM) 5 1/2 INCHES

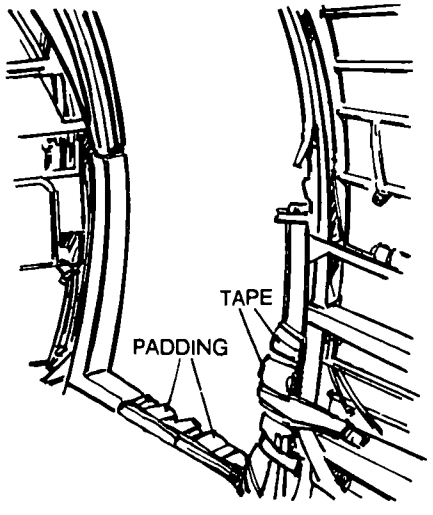
B. METAL PLATE:
LENGTH, 5 1/2 INCHES
WIDTH
(TOP) 4 1/2 INCHES
(BOTTOM) 5 INCHES

C. TAPE





OUTSIDE VIEW



INSIDE VIEW

Figure 13-7. Door frame preparation.

(8) All protruding objects near the ramp and personnel door are removed or taped.

(9) The crew chief's headphones are available and function properly.

13-6. LOADING TECHNIQUES AND SEATING CONFIGURATION

Two ways a parachutist can jump from the aircraft are:

a. **Jumping From the Door.** Following the final briefing, the jumpmaster gives the command to enplane. The parachutists enter the aircraft with the static line over the right shoulder and are seated on the portside.

b. **Jumping From the Ramp.** The parachutists enter the aircraft with the static line over the right shoulder and are seated on the starboard side.

13-7. JUMP COMMANDS AND PROCEDURES

The 6-minute and 1-minute warnings, whether jumping the door or ramp, are given by the pilot to the crew chief, who in turn relays them orally and by hand signals to the static jumpmaster.

a. **Door Jump** (Figure 13-8).

(1) GET READY. All parachutists in the first stick unfasten their seat belts.

(2) STAND UP. Parachutists stand up and move to the starboard side.

(3) HOOK UP. Parachutists kneel and hook up with the open portion of the static line snap hook fastener facing inboard.

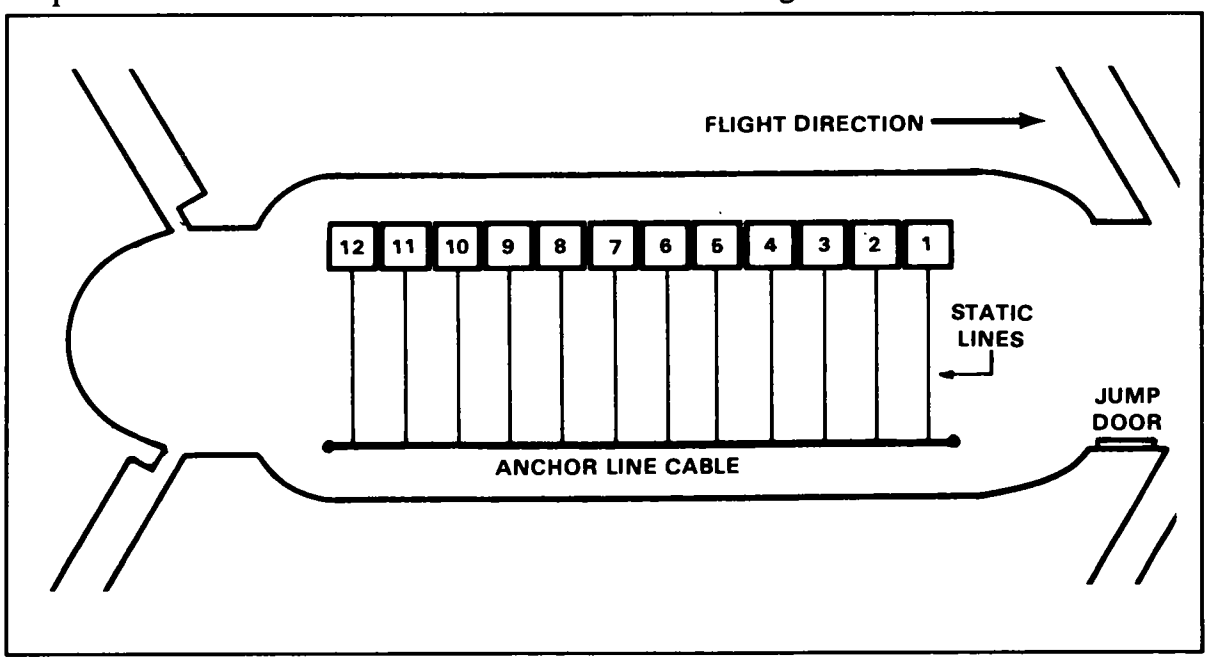


Figure 13-8. Door jump.

(4) CHECK STATIC LINES. The parachutists take a reverse bight (at waist level) of about 8 inches in the static line with the right hand, keep the arm close to the side, and check the static line of the parachutist to the front.

(5) CHECK EQUIPMENT. All parachutists check their equipment.

(6) SOUND OFF FOR EQUIPMENT CHECK.

(7) STAND IN THE DOOR. No. 1 moves to the door and assumes the door position. The parachutist must crouch low to allow at least a 2-inch clearance between the helmet and the top of the door. The other parachutists close up behind No. 1 at normal intervals.

(8) GO. No. 1 exits by jumping straight out the door and assuming the proper body position. The succeeding parachutists move up, make a 90-degree turn at the door, take up a correct door position, and exit in the same manner as No. 1, maintaining a 1-second interval. Upon exit of all parachutists, the crew chief or static jumpmaster recovers all static lines.

WARNING: PARACHUTISTS MUST NOT SPRING UPWARD (VIGOROUS EXIT) WHEN JUMPING THIS HELICOPTER.

b. **Ramp Jump** (Figure 13-9).

(1) GET READY. All parachutists in the first stick unfasten their seat belts.

(2) STAND UP. Parachutists stand up and move to the portside.

(3) HOOK UP. Parachutists kneel and hook up with the open portion

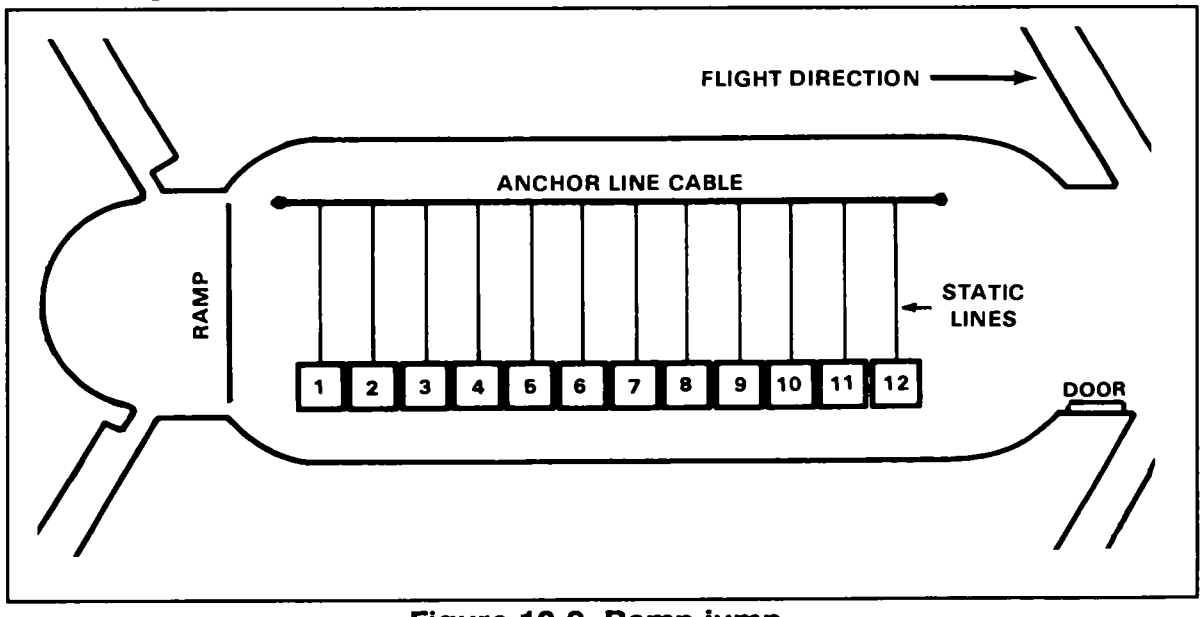


Figure 13-9. Ramp jump.

of the static line snap fastener facing inboard.

(4) CHECK STATIC LINES. The parachutists take a reverse bight (at waist level) of about 8 inches in the static line with the right hand, keep the arm close to the side, and check the static line of the parachutist to the front.

(5) CHECK EQUIPMENT. All parachutists check their equipment.

(6) SOUND OFF FOR EQUIPMENT CHECK.

(7) STAND BY. No. 1 assumes a standing position at the ramp hinge. The remaining parachutists close up interval.

(8) GO. No. 1 walks off the starboard rear of the ramp and assumes a normal body position. The remaining parachutists follow and exit in the same manner as No. 1, maintaining a 1-second interval between parachutists. Upon exit of all parachutists, the crew chief or static jumpmaster recovers all static lines.

WARNING: PARACHUTISTS WALK OFF THE RAMP (WHICH IS LOWERED TO 11 DEGREES BELOW CENTER LINE GAGE) IN A CROUCHED POSITION TO AVOID HITTING THEIR HEADS ON THE UPPER RAMP DOOR. THEY DO NOT MAKE A VIGOROUS EXIT. LESS THAN A 1-SECOND INTERVAL BETWEEN PARACHUTISTS MAY RESULT IN ENTANGLEMENT OF PARACHUTISTS AND STATIC LINES. UPON EXIT OF ALL PARACHUTISTS, THE CREW CHIEF OR STATIC JUMPMASTER RECOVERS ALL STATIC LINES.

13-8. SAFETY

The No. 1 parachutist only jumps from either the ramp or the door with a CWIE on one pass over the DZ. The static jumpmaster or safety personnel ensure that parachutists are hooked up consecutively (1 through 12). The jumpmaster ensures that seats along the starboard side are secured in the up position when jumping from the personnel door, or that seats along the portside are secured in the up position when jumping from the ramp. The speed of the aircraft is 80 knots when jumping. The minimum drop altitude is 1,500 feet AGL.

Section III. CH/HH-3 JOLLY GREEN GIANT (USAF)

The CH/HH-3 is a twin-engine, single-rotor, medium-transport helicopter. Fifteen combat-equipped parachutists can jump from this aircraft (Figure 13-10).

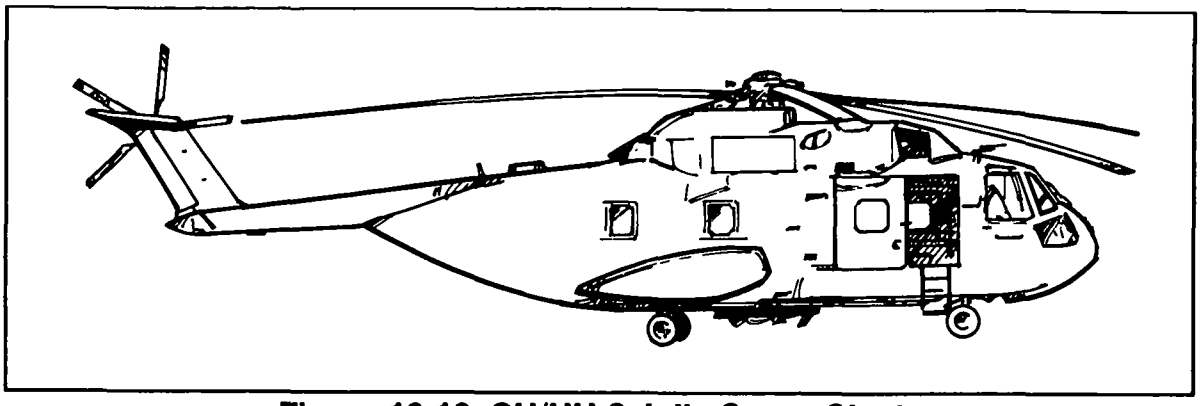


Figure 13-10. CH/HH-3 Jolly Green Giant.

13-9. PREPARATION AND INSPECTION

a. **Preparation.** The following procedures prepare the CH/HH-3 for jumping:

(1) Install the oval-shaped anchor line cable on the starboard side of the aircraft's floor using the tie-down fittings at station No. 193.5 (right of center) as the portside forward attachment point, station No. 212.5 as the starboard side forward attachment, station No. 256.5 as an intermediate starboard side attachment point, and station No. 276.5 as the starboard side rear and portside rear attachment points (Figure 13-11.)

(2) The anchor line cable is constructed of 1/4-inch diameter, 6,400-pound test steel cable. Thread the anchor line cable through five static line snap hooks, where the static line is normally attached. These static line snap hooks connect the anchor line cable to the

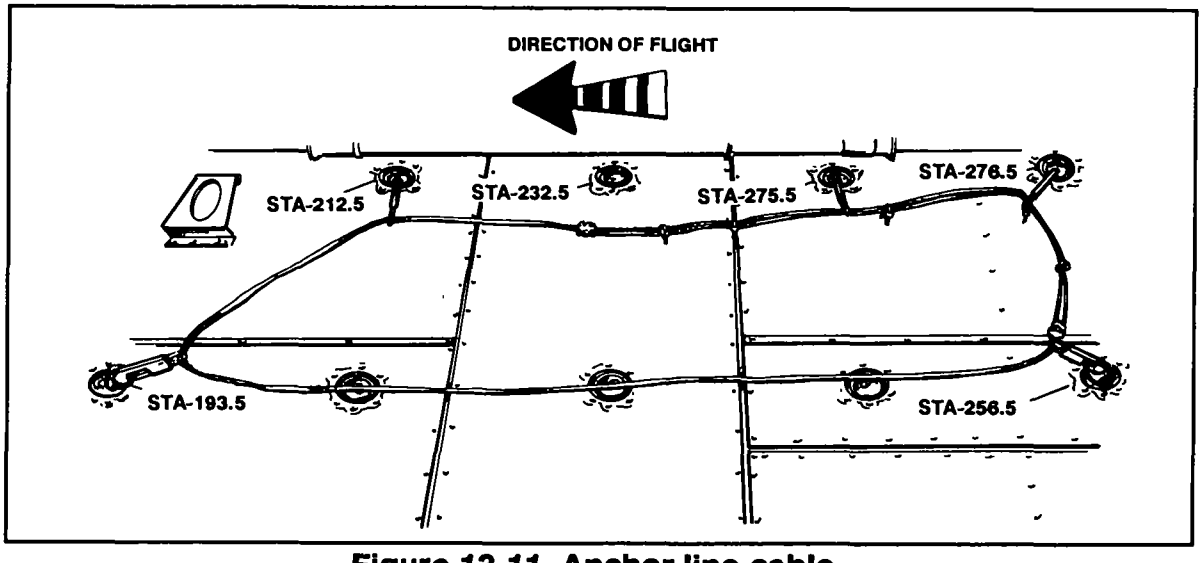


Figure 13-11. Anchor line cable.

tie-down fittings. Complete the oval by overlapping both ends of the steel cable, then securing the overlap with five cable clamps spaced intermittently between the swaged cable ends.

(3) Manufactured cables have the date of initial manufacture and weight testing capacity (2,500 pounds) permanently marked on the starboard side forward static line snap hook. Inspect cables each time the anchor line cable is installed for jumping. Remove cables from service showing excessive wear, corrosion, or more than three broken strands per inch. Weight test cables to a 2,500-pound capacity within each 12-month calendar period. (Example: Cables weight tested on 1 January will be due weight testing by 31 January the following year.) Document annual weight testing on a DD Form 1574, which is attached to the cable.

b. **Inspection.** Before enplaning, the jumpmaster and pilot, or pilot's representative, jointly inspect the aircraft to determine the following:

(1) The main cabin door in secured to the rear and taped to include the door handle and latch.

(2) Any external cargo slings are removed before conducting jump operations.

(3) All protruding objects near the doors are removed or taped. The penetrator is removed before conducting jump operations.

(4) Safety belts are installed for all parachutists and are extended completely to ensure positive hookup while seated.

(5) Seats are fastened securely in the down position with backs loose, minus the four seats raised for anchor line cable installation.

(6) The anchor line cable is tight and free of frays.

(7) The deck is clean and free of oil and water.

(8) The flight engineer's headphones and the jumpmaster's intercomm cord are available and function properly. The fight engineer controls the jumpmaster's static line when performing static jumpmaster duties.

13-10. LOADING TECHNIQUES AND SEATING CONFIGURATION

Parachutists enter the aircraft through the starboard side cabin door with their static line over their right shoulder. They enter the aircraft in reverse stick order with parachutists Nos. 1 through 8 seated on the portside and parachutists Nos. 9 through 15 seated on the starboard side.

13-11. JUMP COMMANDS AND PROCEDURES

a. The 6-minute and 1-minute warnings are given by the pilot to the flight engineer, who in turn relays them orally and by hand signals to the

jumpmaster. Due to the limited space available to hookup, only four parachutists for each pass are airdropped.

(1) GET READY. The first four parachutists remove seat belts.

(2) STAND UP. Parachutists stand up and move to the anchor line cable.

(3) HOOK UP. Parachutists connect their static line snap hook to the anchor line cable with the opening toward the skin of the aircraft.

(4) CHECK STATIC LINE. All parachutists take a reverse bight in the static line, ensuring the static line remains over their bent elbow.

(5) CHECK EQUIPMENT. All parachutists check their equipment. Parachutists jumping equipment must be at the front of their stick.

(6) SOUND OFF FOR EQUIPMENT CHECK.

(7) STAND IN THE DOOR. The first parachutist moves to the main cabin door, stopping about one foot from the door, and awaits the jumpmaster's commands.

(8) STAND BY. The first parachutist moves to the main cabin door and awaits the jumpmaster's commands.

(9) GO. No. 1 walks off the starboard rear corner of the ramp. The remaining parachutists follow at 1-second intervals.

NOTE: Commands are repeated for the next group of four parachutists and are repeated until the aircraft is empty.

WARNING: PARACHUTISTS WALK OUT THE DOOR 90 DEGREES TO THE AIRCRAFT IN A CROUCHED POSITION TO AVOID HITTING THEIR HEADS ON THE UPPER DOOR FRAME. THEY DO NOT MAKE A VIGOROUS EXIT.

b. Parachutists step out the same as exiting the tailgate of a fixed-wing aircraft, maintaining about a 1-second interval between parachutists. Less than a 1-second interval may result in entanglement of parachutists and static lines. Upon exit of all parachutists of each pass, the static line jumpmaster/flight engineer recovers all deployment bags.

13-12. SAFETY

Approaching or loading the aircraft is performed only after visual clearance by the pilot or flight engineer. Before clearing any parachutists to jump, the main gear is confirmed in the up position. The speed of the aircraft during all jump operations is between 70 knots and 90 knots indicated air speed.

PART FOUR

DROP ZONES

CHAPTER 14

PROCEDURES IN THE DROP ZONE

A drop zone is any designated area where personnel and equipment may be delivered by means of parachute or free drop. The drop zone is located where it can best support the ground tactical plan and is selected by the ground unit commander. For tactical training, the USAF Assault Zones Availability Report (AZAR) should be checked for an approved DZ within the tactical area. If the selected DZ is not on the AZAR, a tactical assessment must be conducted.

Section I. SELECTION AND METHODS

The ground unit commander uses the tactical analysis to select an area that can best support his mission. However, there are also several technical selection factors that must be considered, which are discussed in this section.

14-1. TYPE OF AIRCRAFT AND DROP SPEED

AIRCRAFT	DROP SPEED
UH-1H	50 to 70 knots
UH-60	65 to 70 knots
CH-47	80 to 110 knots
C-130	125 to 130 knots
C-141	130 to 135 knots

14-2. DROP ALTITUDE

	DAY (AGL)	NIGHT (AGL)
ARMY AIRCRAFT (ALL SERVICES, ROTARY WING)		
Personnel	*1,500 feet	*1,500 feet
Bundles	300 feet	500 feet
USAF AIRCRAFT (TROOP CARRIER)		
Personnel	800 feet	800 feet
CDS/Bundles	300 feet	500 feet
Heavy Equipment	1,100 feet	1,100 feet

***AWADS/SKE - 500 feet above highest obstacle that falls within 3 miles either side of DZ run in.**

14-3. TYPE OF LOAD

Type of load includes personnel (1-second drop interval), CDS, or heavy equipment (3-second exit interval).

a. **Obstacles.** To ensure that the airdrop is safe, and that equipment and personnel can be recovered or employed to accomplish the mission, the drop zone and adjacent areas should be free of obstacles. Examples of obstacles are:

- Trees 35 feet or higher impeding recovery of personnel or equipment.
- Water 4 feet ~~deep~~.
- Wire that is carrying active current of 50 volts or greater.
- Any other conditions that may injure parachutists or damage equipment (barbed wire fences, swamps, ditches, gullies).

b. **Approach and Departure Routes.** Routes to and from the drop zone should not conflict with other air operations or restrictive terrain, or with man-made objects (television, radio towers).

14-4. DROP METHODS

Different drop methods are:

a. High Velocity. A drogue chute to stabilizes rather than slows the descent of the equipment – for example, a poncho parachute on a rations box.

b. **Low Velocity.** A parachute slows the rate of descent for a soft landing – for example, personnel and cargo parachutes.

c. **Free Drop.** This is cargo that has no device to stabilize or slow the rate of descent – for example, durable items such as clothing bundles.

4-5. ACCESS TO AREA

The unit must have access to and from the drop zone to recover equipment or conduct troop movement. Drop zones with no roads leading to them or next to a river with no bridges are examples of impeded access to areas.

14-6. SIZE

The following information are minimum peacetime sizes when using MAC aircraft and must be adhered to unless a MAC waiver is issued. During contingency/wartime missions, DZ sizes may also be waived. However, size requirements remain a joint responsibility of the commander of the airlift forces (COMALF) and the airborne commander.

a. **Personnel from Army Aircraft.** The ground space required for one parachutist is 300 meters by 300 meters. The distance required for additional personnel is determined by the use of the D = RT formula.

b. **Personnel from USAF Aircraft.** The ground space required is 550 meters by 550 meters for one parachutist from a single aircraft (add 70 meters to the length for each additional parachutist).

(1) For altitudes above 1,000 feet AGL, add 28 meters (one-half each side) to the width and 28 meters (trail edge) for each additional 100 feet.

(2) From official sunset to sunrise, add 95 meters to the width (one-half each side) and length (both ends) for visual drops.

(3) For visual formation, add 95 meters (one-half each side) to the width.

(4) For AWADS and SKE, add 365 meters (one-half each side) to the width.

c. **Heavy Equipment Drops from USAF Aircraft.** The ground space required is 545 meters by 910 meters for one platform from a single ~~aircraft.~~

(1) For a C-130, add 365 meters to the length(trail edge) for each additional platform.

(2) For C-141, add 455 meters to the length (trail edge)for each additional platform.

(3) For altitudes above 1,100 feet AGL, add 28 meters to the width (one-half each side) and to the length (trail edge).

(4) From official sunset to sunrise, add 95 meters to the width (one-half each side) and to the length (one-half each end) for visual drops.

(5) For visual formation drops, add 95 meters to the width (one-half each side).

(6) For AWADS and SKE, add 365 meters to the width (one-half each side).

d. **Containerized Delivery System (CDS) Drops for the C-130.** The ground space required is 365 meters by 365 meters for one container from a single aircraft.

(1) For altitudes above 600 feet, add 37 meters for each additional 100 feet to width (one-half each side) and length (trail edge).

NOTE: Altitudes above 1,000 feet are not recommended.

(2) From official sunset to sunrise, add 95 meters to the width (one-half each side) and to the length (one-half each end) for visual drops.

(3) For visual formation drops, add 95 meters to the width (one-half each side).

(4) For AWADS and SKE, add 365 meters to the width (one-half each side).

e. **Containerized Delivery System (CDS) Drops for the C-141.** The ground space required is 410 meters by 545 meters for one container from a single aircraft.

(1) For altitudes above 600 feet, add 37 meters for each additional 100 feet to the width (one-half each side) and to the length (trail edge).

NOTE: Altitudes above 1,000 feet are not recommended.

(2) From official sunset to sunrise, add 95 meters to the width (one-half each side) and to the length (one-half each end) for visual drops.

(3) For visual formation drops, add 95 meters to the width (one-half each side).

(4) For AWADS and SKE, add 365 meters to the width (one-half each side).

NOTE: The size of the CDS drop zone is dependent upon drop altitude, number of bundles, and type of aircraft. Refer to MAC Reg 3-3, Figure 2-2, for additional containers.

Section II. RELEASE PROCEDURES

The number and type of aircraft that air-delivers personnel and equipment, using one of the four methods, usually dictate the type and composition of the ground support party, which can be tailored for a mission.

14-7. METHODS

To ensure accurate delivery on the DZ, four different methods are used. Each method uses various input from the ground and air in the calculation formula.

a. **Computed Air Release Point (CARP).** The most often used ~~method~~ method in aerial delivery for conventional airborne operation is CARP. The CARP is computed by the air crew (navigator) and determines the release point from the air.

b. **Ground Marked Release System (GMRS).** A method used mostly by special operations forces (SOF) is GMRS. The GMRS is computed by the DZSTL and determines the release point from the ground.

c. **Verbally Initiated Release System (VIRS).** The VIRS is one of the two methods used by services having rotary-wing and ~~small~~ fixed-wing aircraft for small DZs, dropping a specified number of personnel. VIRS is computed by the DZSO; the release point is indicated by an oral command to the aircraft.

d. **Wind Streamer Vector Count (WSVC).** The WSVC is one of two methods used by services having rotary-wing and small fixed-wing aircraft for small DZs, dropping a specified number of personnel. The release point is jumpmaster-directed and is the only method not requiring markings on the DZ.

14-8. ORGANIZATION

To become operational, drop zones require key personnel to be located on the DZ for controlling, marking, medical evacuating, wind readings, and ~~remaining~~ malfunctions.

a. **USAF Combat Control Team and an Army Drop Zone Safety Officer (DZSO).** These are normally used in large joint airborne operations of more than three troop carrier aircraft. CARP is ~~always~~ used.

b. **Drop Zone Support Team.** DZST is composed of single-service personnel (Army), normally used in small joint airborne operations, involving three or less troop carrier aircraft. CARP or GMRS is used.

c. Drop Zone Safety Officer. The DZSO ~~may be one or more personnel~~ who operate a small drop zone, with small aircraft dropping a limited number of personnel. GMRS can be used (usually SOF units). If rotary-wing and small fixed-wing aircraft are

employed, either VIRS or WSVC methods are used.

NOTE: The unit mission request for aircraft specifies the type of drop method to be used, such as CARP, GMRS, VIRS, or WSVC, and composition of the ground support party (CCT or DZSO; DZST or DZSO).

14-9. DROP ZONE SAFETY OFFICER

The USAF and Army DZSO have specific duties, which are discussed as follows.

a. When the USAF CCT is supporting an airborne operation, the DZSO is the airborne commander's (Army) direct representative on the drop zone. He is responsible for the safe operation of the DZ. No personnel or equipment is dropped if the DZSO is not physically on the DZ.

NOTE: The prerequisites to perform the duties of the DZSO are outlined in Part 1, Chapter 1.

(1) *Special duties.* The duties of the DZSO are as follows:

(a) Coordinates with the USAF CCT.

(b) Has the drop zone fully operational one hour before drop time.

(c) Opens the drop zone through range control, and closes it when accountability of personnel, air items, and equipment is completed.

(d) Conducts ground or aerial reconnaissance of the drop zone, before the drop, for obstacles or safety hazards.

(e) Collocates with USAF CCT and takes initial wind readings one hour before the scheduled drop time.

(f) Establishes communications with the DACO NLT one hour before drop time.

(g) Conducts continuous surface wind readings NLT 12 minutes before the scheduled drop. Gives the GO or NO-GO to the CCT (to relay to aircraft) 2 minutes before the scheduled drop.

(h) Monitors surface winds from the parachutists' point of impact and at the highest point of elevation on the drop zone. A no-drop situation exists when surface winds exceed 13 knots within 10 minutes of the actual drop.

(i) Controls all ground and air medical evacuations.

(j) Submits postmission reports to the appropriate agency.

NOTE: The GO, NO-GO that is relayed at 2 minutes does not indicate the final wind reading. If surface winds increase beyond authorized limits, a NO-GO can be relayed at any time thereafter. If readings exceed the limits, the DZSO must reestablish a 10-minute window.

(2) Support requirements. These apply to multiple aircraft formation (USAF aircraft), personnel, and

equipment, or to single aircraft operations on drop zones more than 2,100 meters in length.

(a) The DZSO ensures the ground support team is in place on the DZ one hour before the drop. The support team includes:

- Assistant DZSO.
- Two medical personnel (with FLA).
- Malfunction officer (with camera).
- Parachute recovery detail (with saw and tree-climbing equipment).
- Parachute turn-in detail (with vehicles).
- Radios – one for the DZSO and one for the assistant DZSO (minimum).
- Anemometers, AN/PMQ-3A – one each for the DZSO and assistant DZSO.
- Compasses – one each for the DZSO and the assistant DZSO.
- Smoke grenades.
- Vehicles.
- Road guards.
- Military police (to control vehicles and spectators).
- Boat detail.

NOTE: These requirements may be supplemented based on the type of drop, size of the airborne operation, number of aircraft, and number of parachutists, or where the DZ is geographically located.

(b) Single aircraft (no more than a 20-second exit time of no less than 2,100 meters of usable DZ). The composition of partial control group:

- One DZSO (an assistant DZSO is not required).
- Wind reading from a single location on the DZ.
- One medic (with FLA).
- Malfunction officer (with camera), MO.

NOTE: The DZSO may perform an additional duty as MO, if he has received specialized training in the duties outlined in Chapter 5.

- Parachute recovery detail.
- Radio.
- Anemometer, AN/PMQ-3A.
- Compass.
- Smoke grenades.
- Boat detail and road guards.

b. The DZSO has operational responsibility for the Army aircraft drop

zone. In addition to the DZSO's duties for USAF aircraft drop zones, the DZSO must also:

(1) Be positioned at the release point 15 minutes before drop time. The assistant DZSO is at the highest point of the drop zone or at the opposite end.

(2) Relay a ground weather decision and GO/NO-GO signal to the lead aircraft 2 minutes before the drop for each pass.

(3) During night drops, ensure that all lights on or next to the drop zone, which are not a part of the drop zone marking system, are turned off 5 minutes before drop time and remain off during the drop (except those lights that mark obstacles).

(4) Contact the pilot of the aircraft immediately after the drop, and ask if any personnel or equipment did not drop. He relays this information to the airborne commander on the drop zone.

c. When advised of the coordination appointment by the airborne commander or his representative, the DZSO is furnished the following information:

- Number of lifts.
- Type of aircraft.
- Drop zone requirements.
- Unit SOP.
- Station time.
- Drop time.
- Number of personnel for each pass.

14-10. DROP ZONE SUPPORT TEAM LEADER

In operations in which the CCT is not present, the Army drop zone support team leader (DZSTL) has overall responsibility for the conduct of operations on the drop zone. He represents both the airborne and airlift commanders. The DZSTL assumes all the responsibilities normally associated with the USAF CCT and Army DZSO.

a. Army DZSTs have the primary mission of supporting wartime CDS airdrops for battalion-size units and below, and peacetime airdrops of personnel, CDS, and heavy equipment for one to three aircraft operations. With some exceptions, these primary mission airdrops are limited to day/night visual conditions.

b. Army DZSTs also maintain the secondary mission of supporting other types of airdrops. The secondary missions may include wartime force projection and sustainment of personnel, equipment, and CDS; peacetime airdrops under AWADS and IMC conditions; and VMC formation drops with four or more aircraft.

c. The DZST consists of at least two members. More members may be

required, depending on the complexity of the mission. The senior member of the DZST functions as the DZSTL.

d. If an individual assumes the duties of both the DZSO and the DZSTL, he also is responsible for the following:

(1) Conducting premission coordination.

(2) Evaluating the DZ for suitability and safe operating conditions.

(3) Ensuring all DZ markings are properly displayed.

(4) Operating all visual acquisitions aids.

(5) Ensuring no-drop signals are relayed to the aircraft.

e. Once the DZSTL has been notified and assigned a mission, he must conduct accurate premission coordination. A recommended DZST crew mission briefing checklist below reflects the minimum-essential information that must be addressed and confirmed by the DZSTL. Normally, peacetime drops should employ every acquisition aid and safety device available, including: air-to-ground radio communications, PIBAL mean effective wind measurement, air traffic control light gun, and smoke or flares. During contingency or wartime operations, limited airdrop support equipment is available; therefore, it is important for premission coordination and briefings to be comprehensive with respect to visual signals (drop cancellation, postponement, authentication procedures). The coordination must be timely to ensure DZST has enough time for planning, and for moving to and establishing the drop zone.

f. A recommended DZST/aircrew mission briefing checklist is as follows:

DZ name/location and JA/ATT mission sequence number verified _____

TOT(s) block time (no-drop procedures, for example, race track) _____

Current DZ survey (date) verified _____

Type drop (HE, PE, CDS) _____

Type release (VIRS, CARP, GMRS, AWADS, visual) _____

Type parachutes _____

Ground quick disconnects _____

Number of jumpers/bundles _____

Number and type of aircraft _____

DZ information _____
Markings/signals:
Panels/lights _____
Block letter identification _____
Smoke, flares _____
Emergency no-drop procedures _____
Mission cancellation indication _____

DZ support capabilities:
Radios available/frequencies _____
Visual acquisition aids available _____
NAVAIDS available _____
MEW equipment _____
Airspace coordination verified _____

Aircraft (mission) commander's name, unit of assignment, telephone number _____
_____

DZSTL name, rank, unit of assignment, telephone number _____
_____

Drop score/incident/accident reporting procedure _____
_____

g. The DZSTL should maintain an inventory of basic equipment to support an airdrop mission:

- VS-17 panels.
- Smoke (red, yellow, green).
- White steady lights, preferably Elco or Whalen.
- Air traffic control gun or SE-11 light gun.
- Signal mirror.
- Binoculars.
- Anemometer, AN/PMQ-3A.
- Compass.
- Signal flares.
- PIBAL system with helium source.

NOTE: Other items of equipment/signals may be required as a result of premission coordinates and the complexity of the mission.

CHAPTER 15

COMPUTATIONS AND FORMULAS

Once the composition of the ground party and the selection of a drop zone has been established, several technical aspects must be considered and planned for marking the DZ. This is critical because of the data that must be used (ground, winds, drift-distance formula, forward throw, release point).

15-1. DROP ZONE FORMULAS (pen chg 1 25 June 91)

The mechanics of these formulas are outlined in this paragraph.

a. **Distance Formula (D = RT).** Compute the length of drop zone required for a specific mission by using the D=RT formula. D is the required length (distance) of DZ in meters. R is the ground speed (rate) of the aircraft in meters per second. T is the time required for the aircraft to release its cargo.

(1) To use this formula, convert airspeed (expressed in knots) to ground speed (expressed in meters per second). To convert knots to meters per second, 1 knot equals .51 meter per second.

(2) To determine the time needed to release a parachutist or equipment, use the following factors:

(a) Allow 1 second for each parachutist; do not include the first parachutist (10 parachutists require 9 seconds).

(b) Allow 3 seconds per bundle; do not include the first bundle (3 bundles would require 6 seconds).

(c) Personnel jumping T-10 parachutes may exit both doors simultaneously. The door with the most parachutists is used to calculate the time required.

EXAMPLE:

An aircraft flying at a drop speed of 90 knots with 8 parachutists would require what length of DZ?

STEP 1: (R) 90 knots x .51 = 45.90 meters per second.

STEP 2: (T) 8 parachutists = 7 seconds.

STEP 3: (D) 45.90 x 7 = 321.30 meters.

Always round up the answer to the nearest whole number: D = 322 meters required.

b. **Time Formula (T = D/R).** If a DZ less than the required length must be used, compute the flight time over the DZ to determine how much of the load can be released in one pass. Use the T = D/R formula. T is the time the aircraft is over the DZ. D is the length (distance) of the DZ in meters. R is the ground speed (rate) of the aircraft in meters per second.

(1) To use this formula, convert airspeed (expressed in knots) to ground speed (expressed in meters per second). To convert knots to meters per second, 1 knot equals .51 meter per second. Multiply the drop speed of the aircraft in knots by .51. Round up that answer to the next whole number.

(2) Divide that number into D (the DZ length). This determines T. Any fractional answer is rounded down to the next whole number.

EXAMPLE:

How many parachutists from a CH-47 can a 750-meter-long DZ accept for each pass:

T = ?

D = 750 meters (given).

R = 46 meters per second (90 knots x .51 = 45.9; round up to 46).

SOLUTION: T = D/R.

D/R = 750/46 = 16.3.

T = (round down) 16 seconds.

DZ can accept 17 parachutists (16 parachutists at 1 per second plus 1 free = 17) per pass.

15-2. WIND DRIFT

Two means of determining wind drift are discussed in this paragraph.

a. **Wind Streamer Vector Count.** The WSVC method (Figure 15-1) is used when the release point is determined from the air. It is normally jumpmaster-executed and does not require markings to be placed on the DZ.

(1) On the first aircraft pass over the desired impact point, a streamer is dropped from the aircraft. The aircraft then turns to allow the jumpmaster to keep the streamer in sight. The pilot adjusts his route so that the flight path is over the

streamer on the ground and the desired impact point (in a straight line).

(2) As the aircraft passes over the streamer, the jumpmaster begins a count, stopping the count directly over the impact point. He immediately begins a new count. When that count equals the first count, the aircraft is over the release point for the first parachutist.

(3) The pilot then maneuvers the aircraft to fly along the axis of the DZ and over the release point. Slight adjustments may be made by observing the parachutists as they land on the DZ.

NOTE: This method should not be used for tactical employment since the aircraft is required to make multiple passes over the DZ.

b. **D = KAV Formula.** This is another method for determining the effects of wind on a parachute.

D = Drift of a parachute (in meters) from a given altitude.

K = Constant that represents the characteristic drift of a parachute:

2.5 meters for cargo parachutes (pen chg 25 June 91)

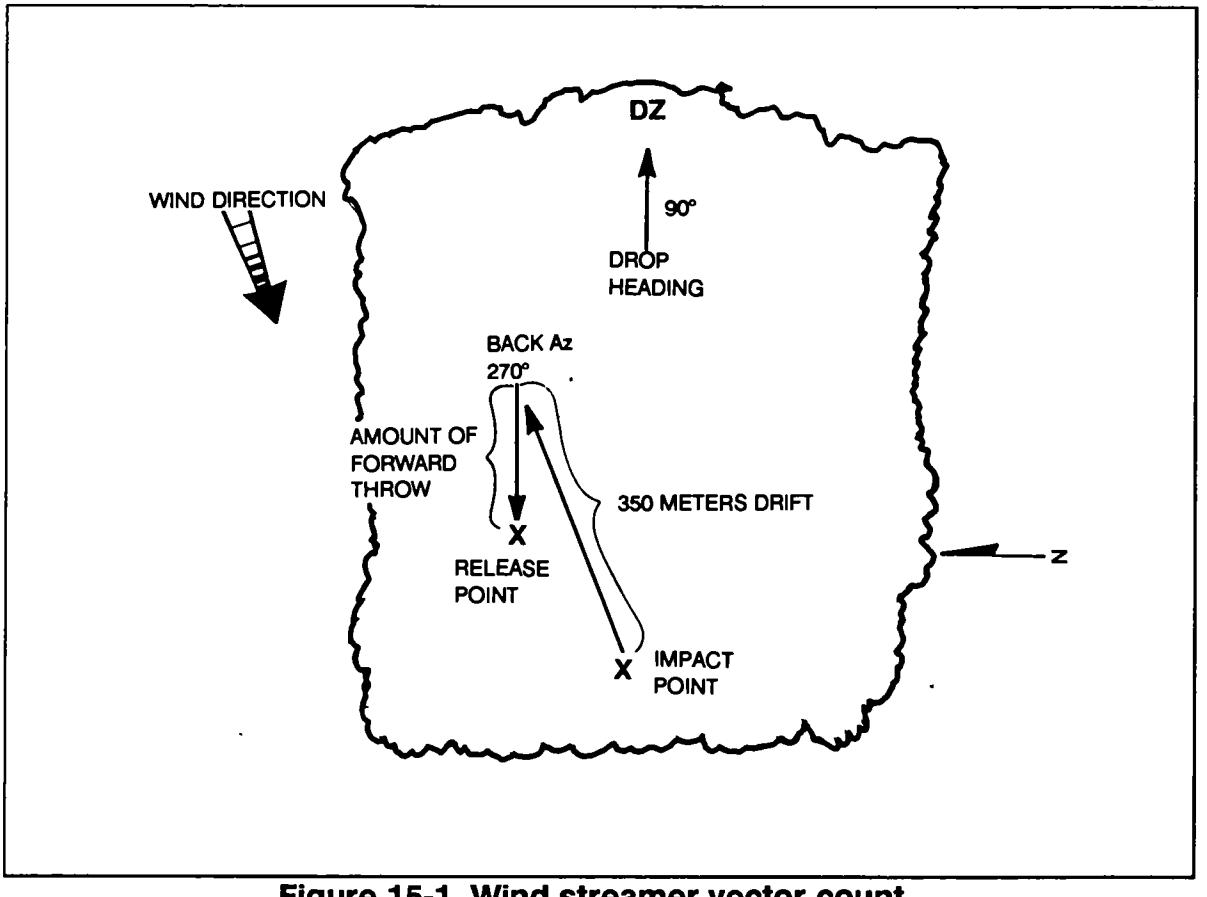


Figure 15-1. Wind streamer vector count.

4.1 meters for personnel parachutes.

A = Altitude (expressed in hundreds of feet).

V = Velocity (in knots) of the mean effective wind determined by the pilot balloon, or of the surface wind as measured with the AN/PMQ-3A anemometer.

15-3. WIND VELOCITY

Two options are available for determining wind velocity. The most effective option is the use of mean effective wind (MEW). This reading is a constant wind speed average from drop altitude to the ground. The pilot balloon (PIBAL) system is used to determine mean effective wind. This system should be used when possible because it is more reliable than the other option, which is surface winds alone. The AN/PMQ-3A is the only device authorized for monitoring surface winds for airdrop operations.

EXAMPLE:

An aircraft is dropping cargo from 500 feet AGL with a surface wind of 10 knots. The drift is calculated as follows:

STEP 1: K = 2.5.

STEP 2: A = 5 (500 feet).

STEP 3: V = 10 (10 knots).

STEP 4: 2.5 x 5 x 10 = 125.0 or 125 meters of drift.

Any fractional answer is rounded up to the nearest whole number.

a. The equipment needed to compute the mean effective wind by the PIBAL method is as follows:

- Helium source.
- Pilot balloons (10 or 30 grams).
- Drift scale or other device for measuring from 0 to 90 degrees.
- Balloon measuring tape.
- 10 gram—57 inches day; 74 inches night.
- 30 gram—75 inches day; 94 inches night.
- PIBAL lighting units for night use.
- Compass.
- Conversion charts (10 and 30 gram) (Figures 15-2 and 15-3).
- Watch with second hand.

b. The procedures for using the PIBAL method are:

(1) Fill the balloon to the required size.

(2) Check the conversion chart for drift time to drop altitude (Figures 15-2 and 15-3).

(10 GRAM HELIUM)

CONVERSION CHART FOR ELEVATION ANGLES TO WIND SPEED IN KNOTS

DRIFT = 100 FT/PER KNOT/PER 1000 FEET ASCENT
DAY (57" CIRCUM) NIGHT (74" CIRCUM)

ANGLE	ALTITUDE IN FEET 500	750	1000	1250	1500	1750	2000	2500	3000	3500	4000	4500	TIME/HGT ASCENSION RATE
70	02	02	01	01	01	01	01	01	01	01	01	01	0:10/ 80'
60	03	02	02	02	02	02	02	02	02	02	02	02	0:20/ 170'
55	03	03	03	03	03	03	03	03	03	03	03	03	0:30/ 250'
50	04	04	03	03	03	03	03	03	03	03	03	03	0:40/ 330'
45	05	04	04	04	04	04	04	04	04	04	04	04	0:50/ 400'
40	06	05	05	05	05	05	05	04	04	04	04	04	1:02/ 500'
35	07	06	06	06	06	05	05	05	05	05	05	05	1:10/ 540'
30	08	07	07	07	07	07	07	07	06	06	06	06	1:20/ 610'
25	10	09	09	09	08	08	08	08	08	08	08	08	1:30/ 670'
24	11	10	09	09	09	09	08	08	08	08	08	08	1:43/ 750'
23	11	10	10	09	09	09	09	08	08	08	08	08	1:50/ 760'
22	12	11	10	10	10	10	09	09	09	09	09	09	2:25/1000'
21	12	11	11	10	10	10	10	10	10	10	10	10	2:44/1100'
20	13	12	11	11	11	11	11	10	10	10	10	10	3:05/1250'
19	14	13	12	12	11	11	11	11	11	11	11	11	3:49/1500'
18	15	13	13	12	12	12	12	12	11	11	11	11	4:30/1750'
17	16	14	13	13	13	13	12	12	12	12	12	12	5:11/2000'
16	17	15	14	14	14	13	13	13	13	13	13	13	6:34/2500'
15	18	16	15	15	14	14	14	14	14	14	14	14	7:58/3000'
14	19	17	16	16	16	15	15	15	15	15	15	15	9:22/3500'
13	21	19	18	17	17	17	17	16	16	16	16	16	10:44/4000'
12	22	20	19	19	18	18	18	18	17	17	17	17	12:08/4500'
11	24	22	21	21	20	20	20	19	19	21	21	21	
10	27	25	23	23	22	22	22	21	21	21	21	21	
09	30	27	26	25	26	24	24	24	23	23	23	23	

Figure 15-2. The 10-gram PIBAL chart.

(30 GRAM HELIUM)

CONVERSION CHART FOR ELEVATION ANGLES TO WIND SPEED IN KNOTS

DRIFT = 100 FT/PER KNOT/PER MINUTE ASCENT
DAY (75" CIRCUM) NIGHT (94" CIRCUM)

ANGLE	ALTITUDE IN FEET 500	750	1000	1250	1500	1750	2000	2500	3000	3500	4000	4500	TIME/HGT ASCENSION RATE
80	01	01	01	01	01	01	01	01	01	01	01	01	0:10/ 120'
70	03	03	03	02	02	02	02	02	02	02	02	02	0:20/ 240'
60	04	04	04	04	04	04	04	04	04	04	04	04	0:30/ 360'
55	05	05	05	05	05	05	05	05	05	05	05	05	0:42/ 500'
50	06	06	06	06	06	06	06	06	05	05	05	05	0:50/ 600'
45	07	07	07	07	07	07	07	07	07	06	06	06	1:02/ 750'
40	09	08	08	08	08	08	08	08	08	08	08	08	1:10/ 830'
35	10	10	10	10	10	10	10	09	09	09	09	09	1:17/1000'
30	12	12	12	12	12	12	12	11	11	11	11	11	1:46/1250'
25	15	15	15	15	15	15	14	14	14	14	14	14	2:10/1500'
24	16	16	15	15	15	15	15	14	15	15	15	15	2:34/1750'
23	17	17	16	16	16	15	15	15	15	15	15	15	2:56/2000'
22	18	18	17	17	17	17	17	16	16	16	16	16	3:43/2500'
21	19	19	18	18	18	17	17	17	17	17	17	17	4:31/3000'
20	20	20	19	19	19	19	18	18	18	18	18	17	5:21/3500'
19	21	20	20	20	20	20	19	19	19	19	19	18	6:09/4000'
18	22	22	21	21	21	21	20	20	20	20	20	20	7:00/4500'
17	23	23	23	22	22	22	22	22	21	21	21	21	
16	25	25	24	24	24	24	23	23	23	23	22	22	
15	27	27	26	26	25	25	25	25	24	24	24	24	
14	29	29	28	27	27	27	27	27	26	26	26	25	
13	31	31	30	30	30	29	29	29	28	28	28	27	

Figure 15-3. The 30-gram PIBAL chart.

(3) Release the balloon and begin timing.

(4) Keep the balloon in sight.

(5) Once the required time has elapsed, read the degrees from the drift scale and determine the azimuth to the balloon with the compass.

(6) Refer to the conversion chart and read down the angle column to the number closest to the angle on the scale.

(7) Read across the top of the chart (altitude in feet) to the drop altitude in use. Read down this column until the two lines (6 and 7) intersect.

(8) Where the two lines intersect is the mean effective wind in knots.

(9) Place the mean effective wind as the variable V in the D = KAV formula to determine the amount of drift in meters.

15-4. FORWARD THROW

Forward throw is the effect that inertia has on a falling object. When an object leaves an aircraft, it is traveling at a speed equal to the speed of the aircraft. The parachutist (or bundle) continues to move in the direction of flight until the dynamics of parachuting takes effect.

a. To determine the amount of forward throw for Army aircraft, divide the drop speed of the aircraft in half. This yields the forward throw in meters. For example, an aircraft flying at 70 knots would have a forward throw of 35 meters.

b. To determine the amount of forward throw when using USAF aircraft, the following distances apply:

	C-141	C-130
Personnel	240 yards	240 yards
CDS	815 yards	550 yards
Heavy Equipment	730 yards	450 yards

15-5. RELEASE POINT

For CARP operations, the navigator on board the aircraft determines when the load is to be released from the aircraft (green light). For GMRS and VIRS operations, ground personnel determine the release point (Figure 15-4).

a. Drop heading on all DZs is dependent on two factors— long axis and prevailing winds. Use both when the situation permits. However, long axis is the primary concern.

NOTE: On some DZs, predetermined drop headings must be adhered to.

b. The location selected where the first bundle or parachutist should land is known as the point of impact (PI). The PI should be located along the center line of the DZ. However, due to the

tactical situation, the PI may be located near the woodline. Use a buffer ~~zone on one or both ends of the DZ for safety reasons~~.

c. To compensate for wind drift, move from the desired point of impact into the wind the number of meters calculated using the D = KAV formula. For example, if drift equals 350 meters from the PI, face into the wind and walk 350 meters in a straight line.

d. To compensate for forward throw, face the back azimuth of the drop heading and walk the appropriate forward-throw distance to the release point.

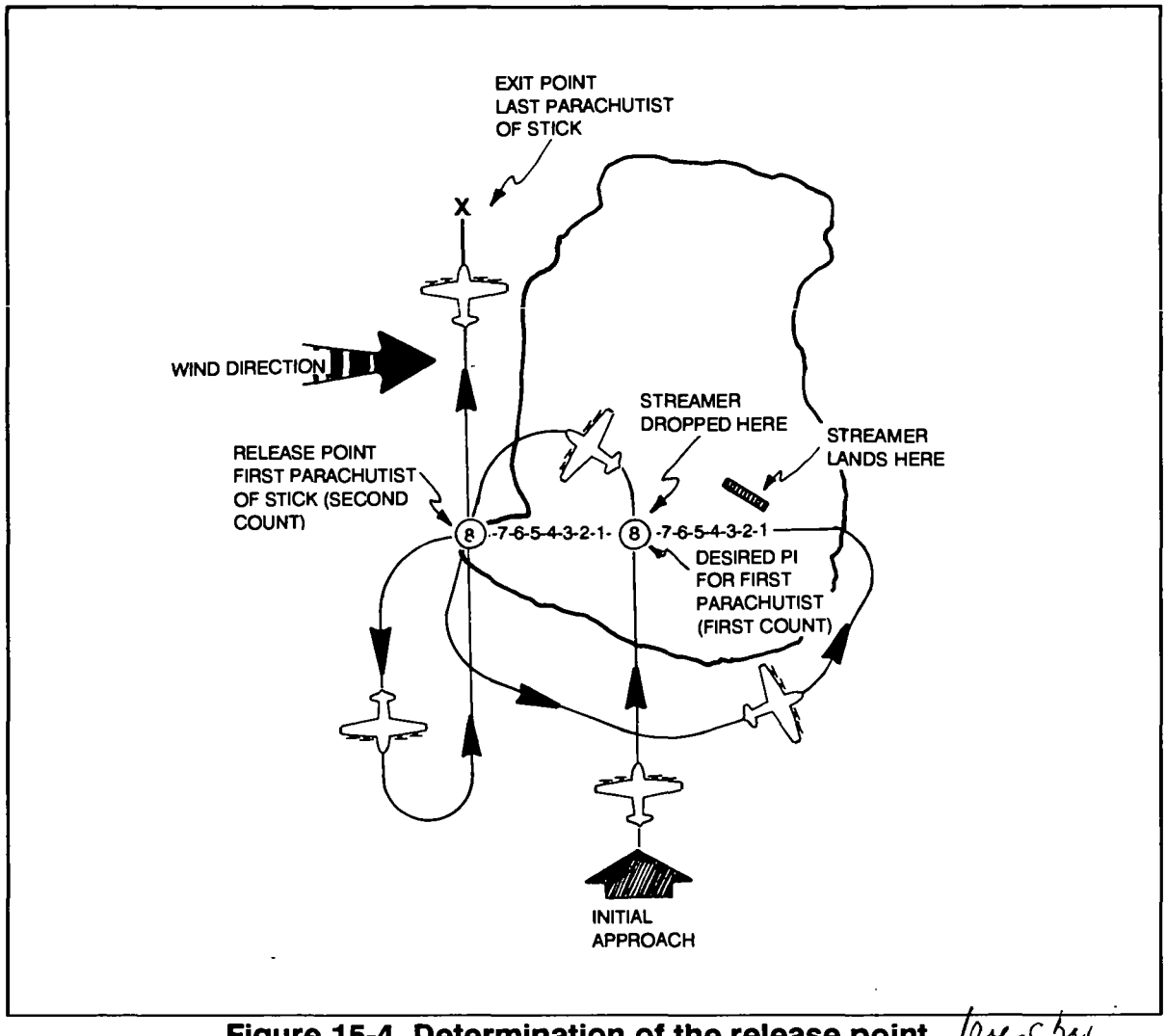


Figure 15-4. Determination of the release point.

CHAPTER 16

ESTABLISHMENT/OPERATION OF A DROP ZONE

Four methods may be used to establish or operate a drop zone. Three of these require markings to be placed on the DZ: computed air release point (CARP), ground marked release system (GMRS), and verbal initiated release system (VIRS). The wind streamer vector count method requires no markings on the DZ (see Chapter 15).

16-1. COMPUTED AIR RELEASE POINT

This method of operation is used only by USAF aircraft in conjunction with CCT or a qualified DZST.

a. The DZ party marks the PI on the DZ, and the aircraft navigator computes the release point from the air.

b. Day markings normally consist of eight VS-17G panels placed flat on the ground. These panels form a block letter a minimum of 35 feet by 35 feet. The only letters that may be used are A, C, J, R, or S. On circular-shaped DZs, the letters H and O may be used. A raised angle marker (RAM) may also be placed at the PI in place of a code letter or used in conjunction with the code letter. When used with the code letter, the RAM is placed at the top of the code letter.

c. Night markings consist of the same letters authorized for day use; however, the letters are formed by a minimum of nine white omnidirectional lights placed on the surface of the DZ. On night CARP DZs, an amber rotating beacon must be placed on the center line and on the trailing edge of the DZ.

d. In addition to the block letter for day operations, smoke may be displayed downwind and adjacent to the point of impact. On night DZs, a white air traffic control light and or flares may be displayed from the drop zone at the control center location.

e. The points of impact for CARP operations are as follows:

(1) For personnel, drops at the PI are 300 yards (day) and 350 yards (night) from the leading edge.

(2) For CDS/bundles, drops at the PI are 200 yards (day) and 250 yards (night) from the leading edge.

(3) For heavy equipment, drops at the PI are 500 yards (day) and 500 yards (night) from the leading edge.

NOTE: On most USAF surveyed DZs, the PI for a particular type load is predetermined. Its surveyed location can be found on MAC Form 339.

f. Timing points may be marked for night operations if requested by the aircrew. These points should be equal distant from the extended center line of the DZ, not further than 1,300 yards from the PI, and between 300 and 350 yards (350 minimum C-141) on each side of the center line. Each point is marked with a green rotating beacon. If required for day operations, each timing point consists of three VS-17G panels that are side by side. (Location for day timing points are the same as for night.) (See Figures 16-1 and 16-2.)

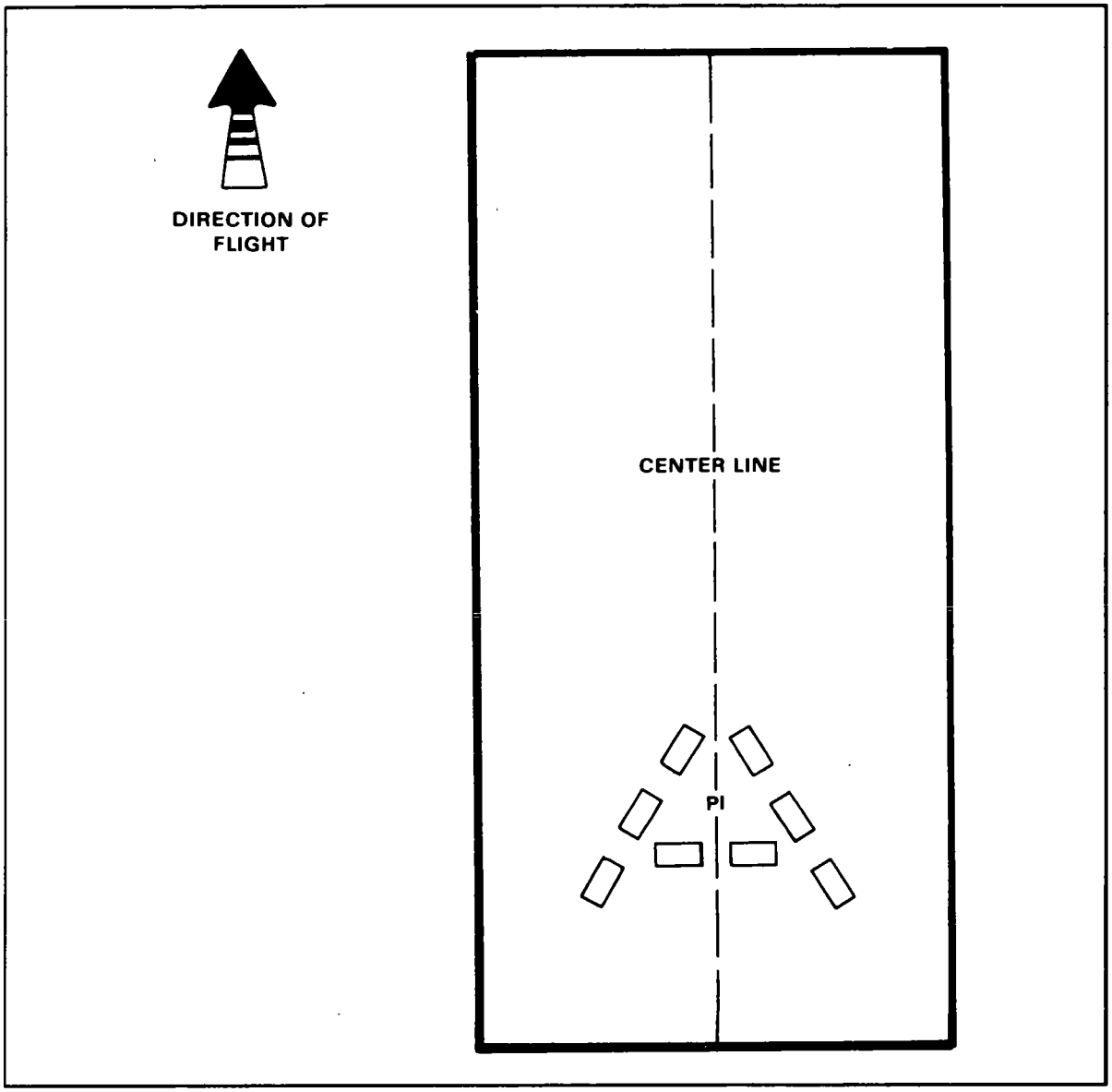


Figure 16-1. Day CARP drop zone markings.

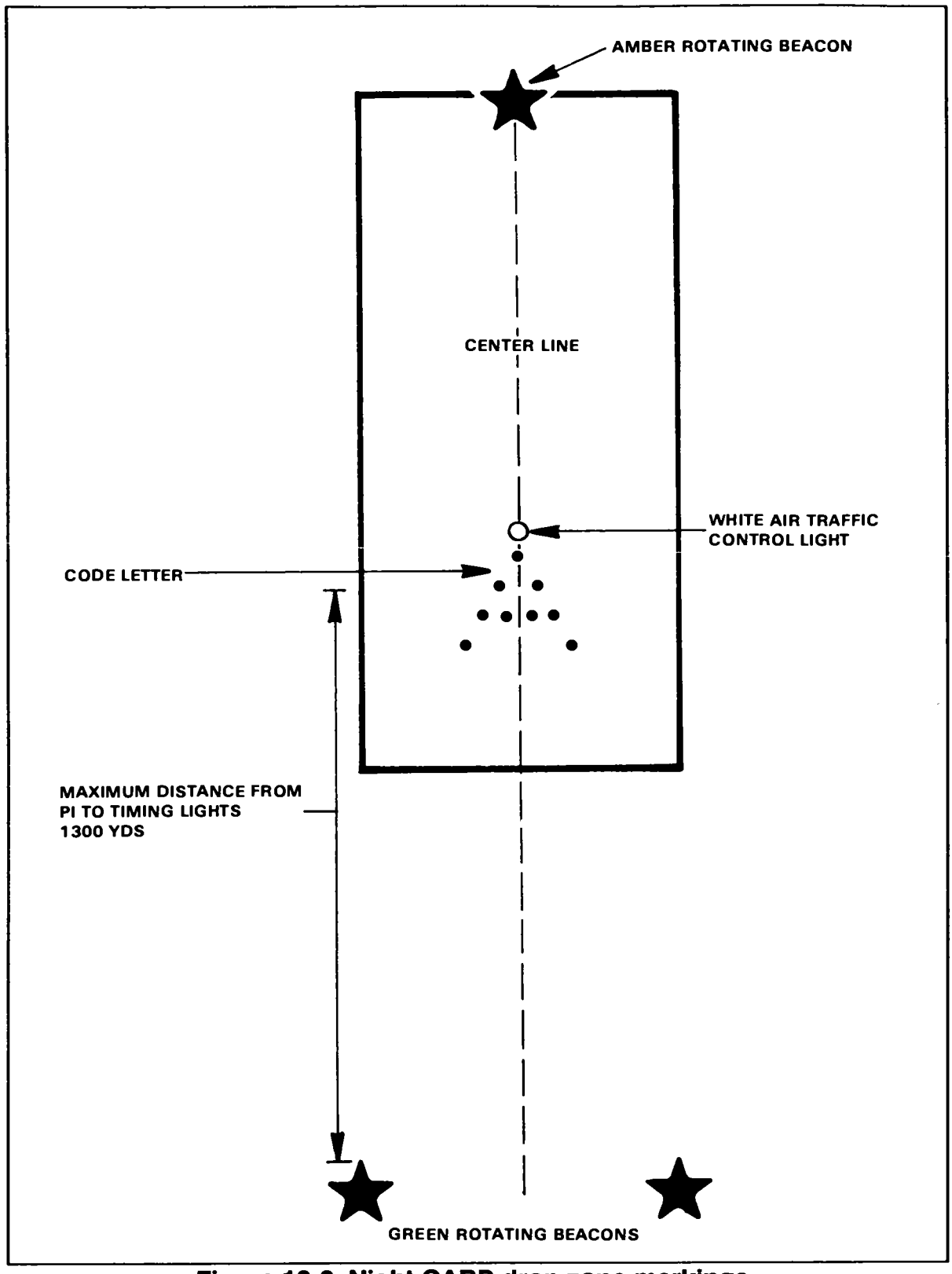


Figure 16-2. Night CARP drop zone markings.

g. No-drop conditions are relayed to the aircraft in the following ways: red smoke, red flares, forming the code letter into two parallel bars perpendicular to flight, or the absence of a planned signal. Forming the code letter into an X indicates mission cancellation.

NOTE: The type of marking used is coordinated in the premission briefing.

h. Control center locations (location of DZSTL) are as follows:

(1) Personal drops are normally located at the PI.

(2) CDS is located 150 yards to the 6 o'clock position of the PI.

(3) Heavy equipment, free drops, high velocity, and AWADS with a ceiling of less than 600 feet are off the DZ.

16-2. GROUND MARKING RELEASE SYSTEM

The GMRS is a method of marking the release point on the DZ. The pilot uses the markings to adjust his flight path 100 meters to the right of the corner panel and parallel to the approach-corner panel axis.

a. The GMRS uses markings known as the inverted L. When the drop aircraft is 100 meters directly to the right of the corner (A) panel, the drop is executed.

b. Placement of the markings are as follows:

(1) From the RP, move 100 meters to the left (90 degrees) of drop heading. This is the location of the corner (A) panel. Emplace a VS-17G panel with the long axis or the panel parallel with drop heading. The panel is elevated at a 45-degree angle toward the approaching aircraft. This aids the aircrew and the jumpmaster in visual identification of the DZ.

(2) From the corner (A) panel, move in the same direction as above for 50 meters. This is the location of the alignment (B) panel. Emplace this panel the same as described above.

(3) From the alignment (B) panel, move 150 meters in the same direction as above. This is the location of the flanker (C) panel. Emplace this panel the same as described above.

(4) From the corner (A) panel, move 50 meters on a back azimuth of a drop heading. This is the location of the approach (D) panel. Emplace this panel the same as described above.

(5) At night, replace all panels with a white light. Lights may be shielded on three sides or placed in pits.

(6) During daylight operations, smoke may be displayed at the release point. During nighttime operations, a white air traffic control light may be used (Figure 16-3).

(7) NO DROP may be signaled to the aircraft by red smoke, red flares, scrambled panels, or the absence of a planned signal.

c. Since the aircraft is required to fly along the markings on the DZ, it is important that these markings be visible to the aircrew. If any portion of the inverted L falls within a 15 to 1 (15:1) mask clearance ratio of obstacles on the approach end of the DZ, a code letter (H, E, A, T) or far panel must be

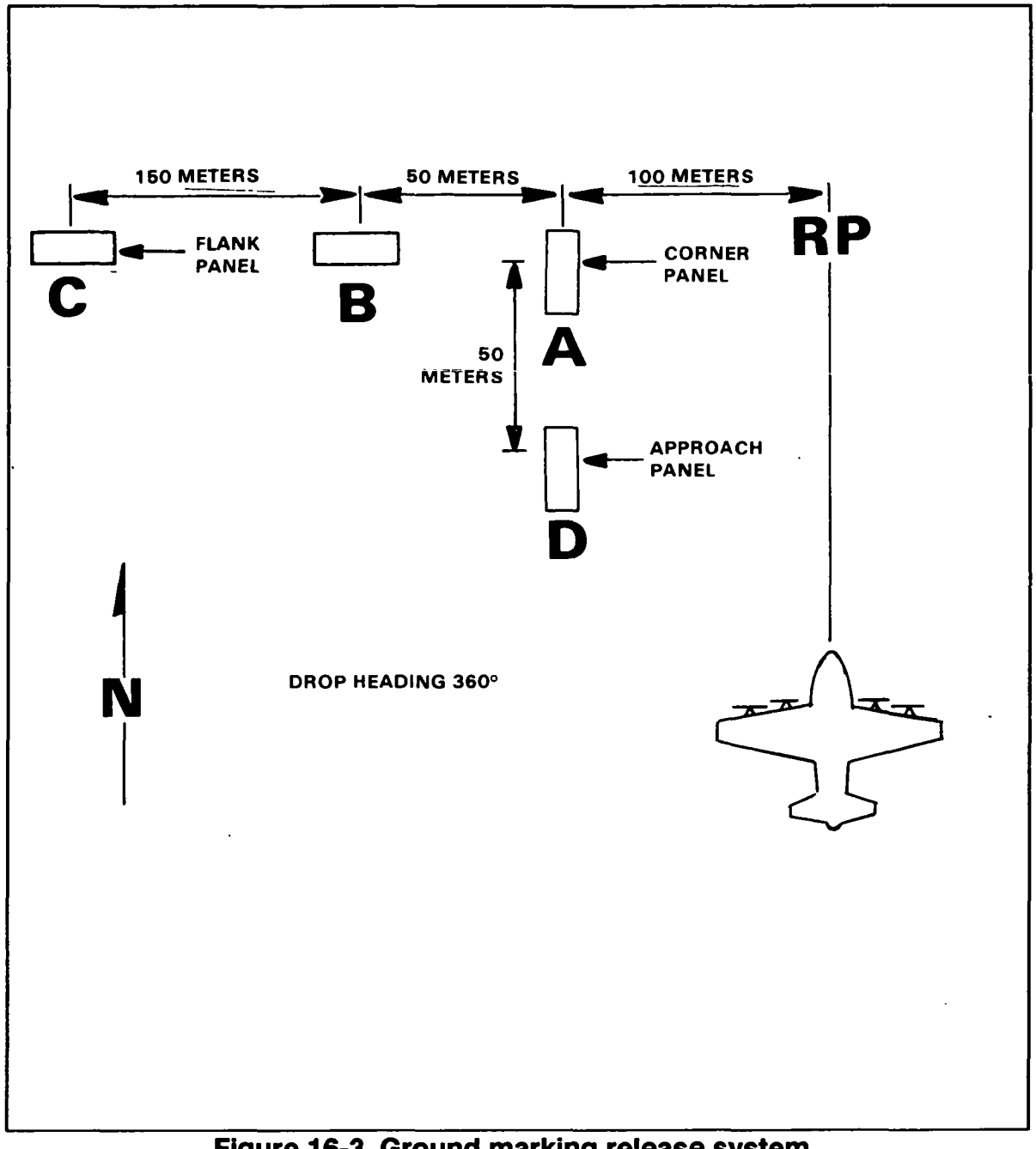


Figure 16-3. Ground marking release system.

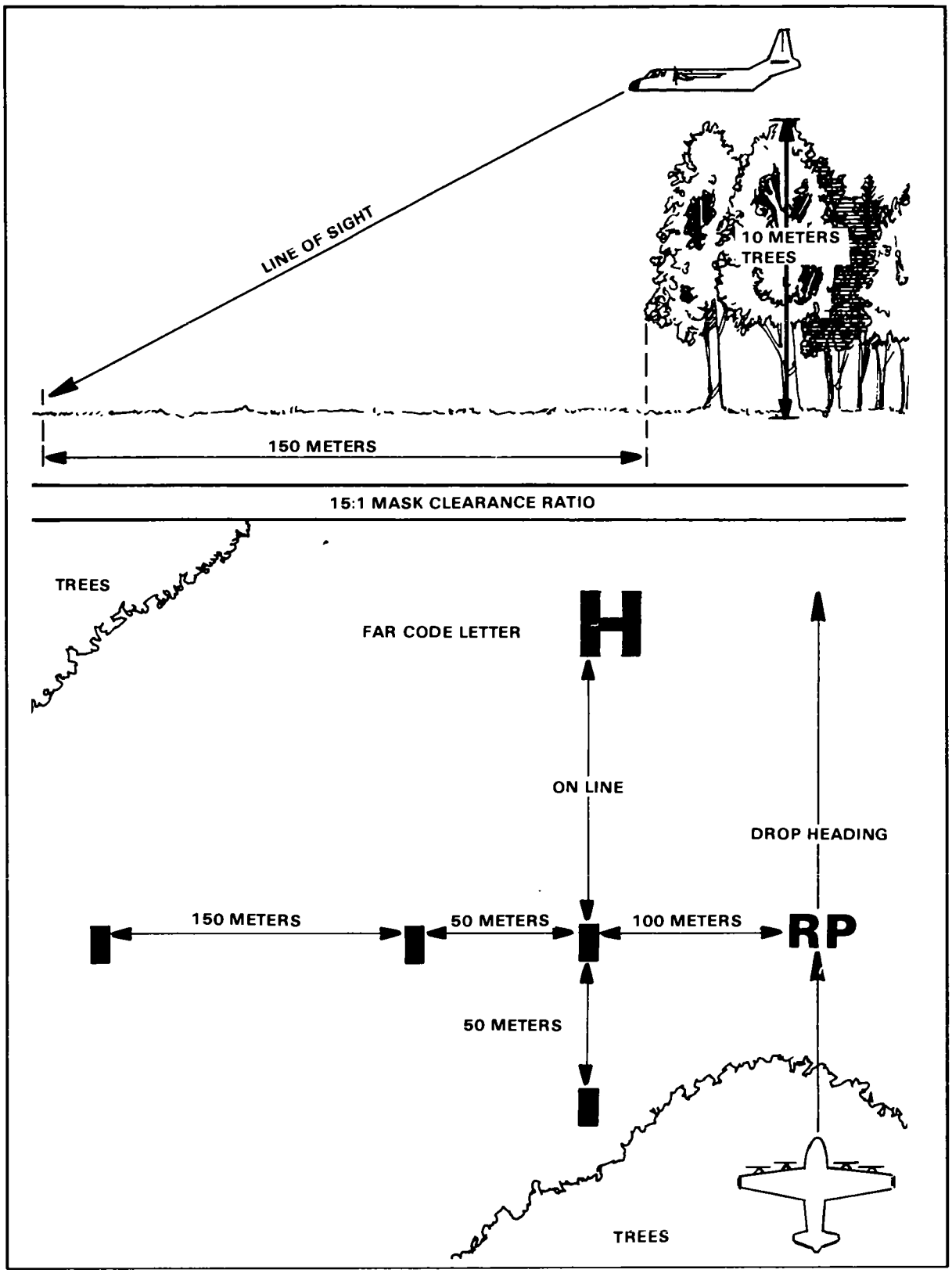


Figure 16-4. The 15:1 mask clearance ratio.

(pen chg 1 25 June 91)

~~placed on the departure end of the DZ~~ (Figure 16-4). This far marking is on line with the corner (A) panel to allow the aircrew to begin alignment on the release point until the inverted L comes into view. If a code letter is used, it can be used to distinguish the DZ from other DZs in the area.

(pen chg 1 25 June 91)

16-3. VERBALLY INITIATED RELEASE SYSTEM

The VIRS is a method of executing the drop over the release point by a verbal command from the ground to the aircraft. Normally a code letter (H, E, A, T) marks the release point. This method of airdrop allows the conduct of the operation with minimum amount of prior DZ information and coordination (Figures 16-5 and 16-6). The aircraft flies the given direction until the DZST/DZSO gains visual contact with the aircraft. Once the aircraft identifies the DZ, the DZSO/DZST radio operator directs the aircraft over the release point on the drop heading. When

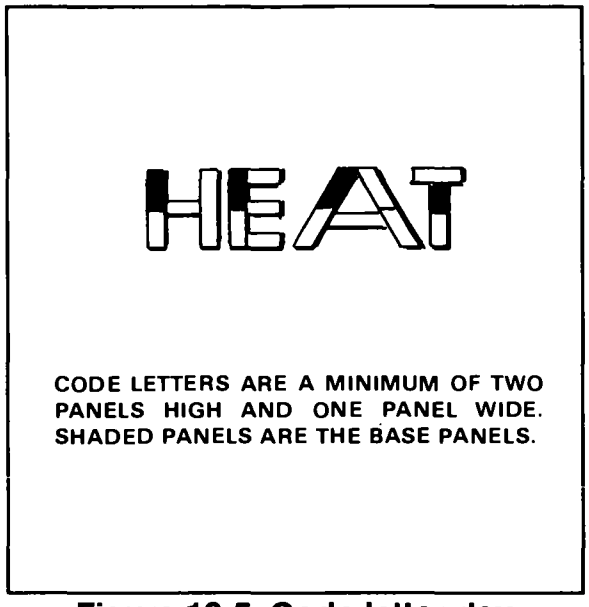


Figure 16-5. Code letter day markings. (pen chg 1 25 June 91)

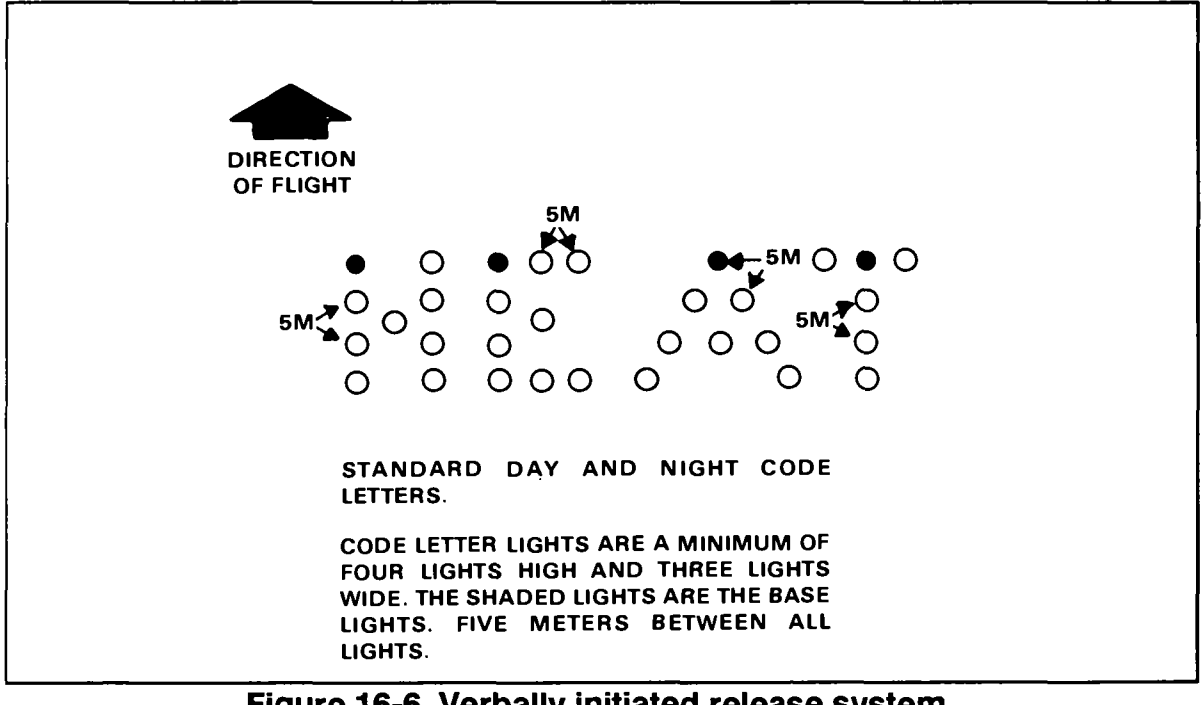

DIRECTION OF FLIGHT
5M
5M
5M
5M
STANDARD DAY AND NIGHT CODE LETTERS.
CODE LETTER LIGHTS ARE A MINIMUM OF FOUR LIGHTS HIGH AND THREE LIGHTS WIDE. THE SHADED LIGHTS ARE THE BASE LIGHTS. FIVE METERS BETWEEN ALL LIGHTS.

Figure 16-6. Verbally initiated release system.

the aircraft is directly over the RP, the command EXECUTE is given to initiate the drop.

a. Day DZ Markings(Figure 16-7).

(1) The DZSO determines the release point. He then emplaces the code letter on drop heading with the base panel of the letter at the release point. The code letter is formed by VS-17G panels placed together. Each letter is two panels high and one panel wide.

(2) The flank panel is placed parallel to the code letter and aligned with the base panel. It is placed 200 meters (or at the edge of the DZ, whichever is less) to the left of the code letter.

(3) The far panel is placed 500 meters from or at the edge of the DZ, whichever is closer to the base panel, and on line with the drop heading.

(4) Both the far and flank panels consist of a single VS-17G panel. These panels may also be elevated at a 45-degree angle to improve visibility.

b. Night DZ Markings (Figure 16-8).

(1) The procedures for establishing the DZ are the same for night operations except that white light is used for the code letter and far/flank markings.

(2) Each code letter is four lights high and three lights wide. There is a distance of 5 meters between each light in the code letter. The far and flank lights are signal lights. Also a

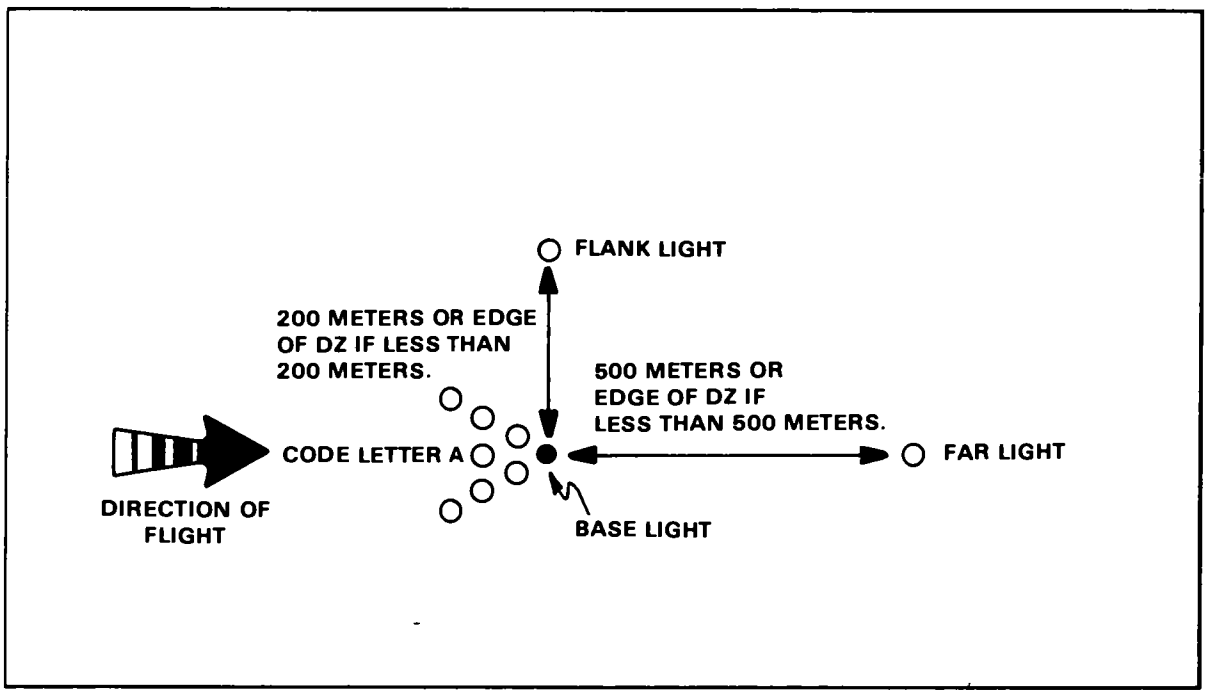

FLANK LIGHT
200 METERS OR EDGE OF DZ IF LESS THAN 200 METERS.
500 METERS OR EDGE OF DZ IF LESS THAN 500 METERS.
CODE LETTER A
FAR LIGHT
DIRECTION OF FLIGHT
BASE LIGHT

Figure 16-7. Day markings (VIRS). /pen chg/ 25June91

white-and-red lens ATC (SE-11) light should be located at the RP.

(3) Lights may be shielded on three sides or placed in pits to prevent enemy ground observation.

16-4. GUIDANCE PROCEDURES

During Army DZ operations, the ground-to-air (GTA) is responsible for guiding the jump aircraft to the DZ, over the DZ on the proper drop heading, and at the proper altitude and drop speed. He ensures the parachutists exit the aircraft at the proper release point. Once the parachutists have exited the aircraft, the GTA must then clear the aircraft from the control zone. For example:

Pilot: C3D36, this is A2A22, over.

GTA: A2A22, this is C3D356, over.

Pilot: D36, this is A22, CCP inbound for a personnel parachute drop, over.

GTA: A22, this is D36, state type a number, over.

Pilot: D36, A22 is a single UH-1H, over.

***GTA**: A22, this is D36, (GTA reads entire ATC block and ends the transmission with: continue approach for visual identification, over).

***ATC block (air traffic control): Heading _____ Distance _____ (from CCP) Drop heading _____ Drop altitude _____ (feet indicated) Drop speed _____ No. jumpers/bundles that can be accepted _____**

Pilot: Wilco.

Upon sighting aircraft:

GTA: A22, this is D36, I am at your 11 o'clock, 500 meters, signal out, can you identify, over.

Pilot: D36, A22 identifies orange panel, over.

GTA: A22, D36 has visual contact, turn to drop heading, over.

Pilot: D36, A22 turning drop heading, over.

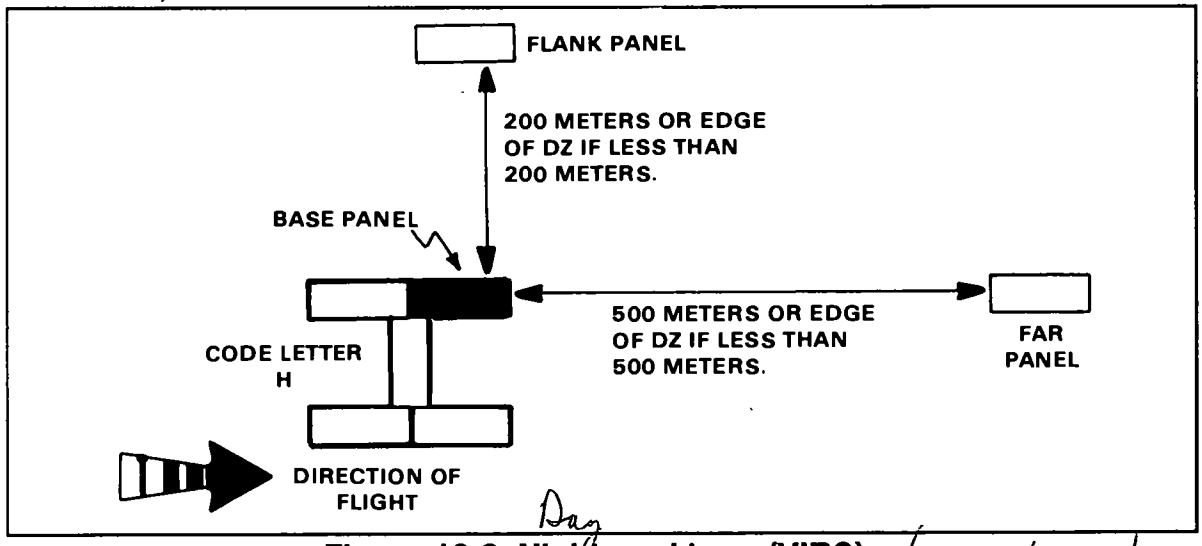

FLANK PANEL
200 METERS OR EDGE OF DZ IF LESS THAN 200 METERS.
BASE PANEL
500 METERS OR EDGE OF DZ IF LESS THAN 500 METERS.
FAR PANEL
CODE LETTER H
DIRECTION OF FLIGHT

Figure 16-8. Night markings (VIRS).

GTA: A22, this is D36, steer left/right, over.

Pilot: D36, A22 roger.

GTA: A22, this is D36, on course, over.

Pilot: D36, A22 roger.

When aircraft is 8 to 10 seconds out from release point:

GTA: A22, this is D36, with six jumpers, stand by, over.

Pilot: D36, this is A22, standing by, over.

When aircraft is directly over release point:

GTA: A22, this is D36, with six jumpers, execute, execute, execute. (GTA must say "execute" or "no drop" at least three times or until first load exits.)

At completion of operation:

GTA: A22, this is D36, I observe six jumpers away and clear, state intention and report when clear of my control zone, (issue any advisories), over. (GTA must place aircraft into a closed traffic pattern with a reporting point if more than one pass is required.)

16-5. ACCEPTABLE WIND LIMITATIONS

Maximum allowable surface wind for personnel drops is 13 knots. The maximum surface winds for heavy equipment is 17 knots with ground quick disconnects, 13 knots without, and 20 knots for CDS using G13/14 parachutes. There is no altitude wind limitation.

16-6. THE 10-MINUTE WARNING

On multiple aircraft operations or single aircraft operations using more than 2,100 meters of DZ, the surface wind is measured from two points on the DZ. For single operations using less than 2,100 meters of DZ, the wind is measured from only one location, normally the PI or RP. Beginning 12 minutes before TOT, the DZSO begins a constant monitoring of the surface wind using the AN/PMQ 3A anemometer.

a. If the surface wind exceeds allowable wind limits, the aircraft is notified of a no-drop, and a new 10-minute window is established. If the wind remains within limits during this new window, the drop takes place as planned. If the winds exceed allowable limits during the new window, no-drop is again relayed to the pilot and the entire procedure will start again.

b. No-drop may be relayed to the aircraft by radio, red smoke, red flares, scrambled panels, or another planned signal.

16-7. POSTMISSION REQUIREMENTS

Immediately following the operation, several reports must be forwarded to a higher headquarters.

a. These reports include the following:

- DZSO report.
- Malfunction report.
- MAC Form 168 Airdrop/Airland/Extraction Zone Control Log (Figure 16-9, page 16-12, 16-13).
- Incident reporting format (Figure 16-10, page 16-14).

b. Most of these reports are self-explanatory and require little time to complete. The MAC Form 168 is used to record strike report information. The DZSTL forwards it to his air operations officer who in turn submits it through the chain of command to the USAF representative.

16-8. SURVEYS

USAF DZs are surveyed by qualified CCT/DZST. All information concerning the DZ is placed on a MAC Form 339, Drop Zone Survey (Figure 16-11, page 16-15). This form provides the user the essential information to operate the DZ. Section 14 of the form states what type of missions may be conducted on the DZ.

a. During contingency/wartime and major exercises, DZSTs may be expected to tactically locate, inspect, and approve a potential DZ for follow-up airdrop of resupply or reinforcements.

b. Tactical DZ assessment is accomplished using the following checklist:

- DZ name or intended call sign
- Topographical map series and sheet number.
- Recommended approach axis magnetic course.
- Point of impact location (eight-digit grid).
- Leading edge centerline coordinates (eight-digit grid).
- DZ size in meters or yards.
- Air traffic restrictions/hazards.
- Name of surveyor and unit assigned.
- Recommended approval/disapproval (cite reason for disapproval).
- Remarks (include a recommendation for airdrop option, CARP, GMRS, VIRS, or blind drop).

NOTE: Airdrop operations on tactically assessed DZs are made only under the following conditions:

1. During training events, the airdrop is located wihtin a military reservation or on US government leased property.

2. The supported service accepts the responsibility for any damage that occurs as a result of airdrop activity.

3. There is adequate time for safe effective planning.

AIRDROP / AIRLAND / EXTRACTION ZONE CONTROL LOG

DATE: 4 MAR 89

LOCATION	CCT AND UNIT	DZ/LZ/EZ CONTROL OFFICER AND UNIT	DROP ZONE SAFETY OFFICER AND UNIT
FALCON DZ	1721 CCS SSGT EVANS SRA GILL		2F550 CAPT STARKEY

LEGEND

AH–Airland (Heavy)
AL–Airland
CD–CDS
ED–Extraction (Drogue)
EX–Extraction
GM–GMRS
HE–Heavy Equipment
HO–HALO
IL–Inverted "L"
LS–Instrument Landing System
PE–Personnel
RB–Radar Beacon Drop
TC–TT B CDS
TH–TT B Heavy
TP–TT B Personnel
WD–AWADS
SCORE METHOD
E – Estimated
P – Paced
M – Measured

LINE NO	TYPE ACFT	UNIT	CALL SIGN	PILOT/ NAVIGATOR	TYPE MSN	ETA	ATA	STRIKE RPRT		AL/EX		SURF WIND	SCORE METHOD	MEAN EFFECTIVE WIND			REMARKS (Continue on Reverse)
							ATO	YOS	CLOCK	S	U			TIME	ALT	DIR & VEL	
1	C-130	317	27 COUNTY		HE	1000	1000	250	S			0209	E	0945	1100	158/09	
2					PE		1012	DRY	PASS								
3					PE		1025	50	6								
4					PE		1029	600	5								
5																	
6	C-141	437	52 BASKO		CD	1100	1100	250	6			0210	E	1045	600	150/11	
7			54				1105	100	8								
8			55				1110	200	4								
9			59				1115	200	6								
10																	
11																	
12																	
13																	
14																	
15																	

MAC FORM FEB 75 168 PREVIOUS EDITION IS OBSOLETE

Figure 16-9. Example of completed MAC Form 168.

1. **DATE box** (date of airdrop).
2. **LOCATION box** (name of DZ).
3. **CCT AND UNIT box** (DESTL name and unit).
4. **DZ LZ EZ CONTROL OFFICER AND UNIT box** (if used).
5. **DROP ZONE SAFETY OFFICER AND UNIT box.**
6. **LINE NO column** (mission sequence number of each aircraft).
7. **TYPE ACFT column** (type of aicraft).
8. **UNIT column** (unit of aircraft).
9. **CALL SIGN column** (call sign of pilot).
10. **TYPE MSN column** (type of mission, refer to LEGEND for abbreviations).
11. **ETA column** (estimated time of arrival, estimated TOT, S3 airbrief).
12. **ETA column** (actual arrival time of every pass).
13. **STRIKE RPRT columns.**

    YDS column (distance first jumper/container lands from PI in yards. If within 25 yards, it is scored a PI).

    CLOCKS column (using direction of flight as 12 o'clock and its back azimuth as 6 o'clock, estimated direction from PI to first jumper/bundle).
14. **SURF WIND column** (surface wind, direction in degrees and velocity in knots).
15. **SCORE METHOD column** (refer to LEGEND).
16. **MEAN EFFECTIVE WIND columns** (time taken, to what altitude).

    TIME column (time taken).

    ALT column (what altitude taken to, should be drop altitude).

    DIR & VEL column (wind direction in degrees and velocity in knots).

Note: Every aircraft has a mission sequence number (entered under line number column). Subsequent passes by that same aircraft will all be scored on separate lines (in the order that they occur) immediately below the line for the first pass.

Instructions for preparing MAC Form 168 Airdrop/Airland/Extraction Zone Control Log.

A. GENERAL

(1) JA/ATT Sequence Number _____

(2) Date (Of Operation) _____

(3) TOT (Local Time) _____

(4) Type Mission _____

(a) Number of Aircraft _____

(b) Type Aircraft _____

(c) Type Assault Zone _____

(d) Type of Delivery (CARP, VIRS, GMRS) _____

B. PERSONNEL INVOLVED

(1) Flying Unit _____

(2) Unit Supported _____

(3) DZSTL (Name/Rank/Unit) _____

(4) Medics (In Place) _____

(5) POC for Further Information _____

C. ASSAULT ZONE

(1) Name/Type _____

(2) Location _____

(3) Any Deviations From Survey _____

(4) Marked IAW the Survey _____

D. COMMUNICATIONS WITH AIRCRAFT

(1) Type Radios _____

(2) Frequency Used _____

(3) Problems _____

E. WEATHER PASSED TO AIRCRAFT

(1) Time of Observation _____

(2) Time Weather was Passed to Aircraft _____

(3) MEW _____

(4) Surface Wind _____

(5) Remarks _____

F. POST INCIDENT WEATHER OBSERVATION _____

_____

G. NARRATIVE _____

_____

_____

Figure 16-10. Suggested format for incident reporting.

DROP ZONE SURVEY

1 DZ NAME: NIJMEGEN

2 LOCATION: 6 M. SE OF SOUTHERN PINES NC

3. MAP SERIES / SHEET NUMBER / EDITION AND DATE OF MAP: SERIES V742 SHEET 5151 III EDITION 5-DMA DATE OF MAP: 1976

4 DATE SURVEYED: 8 Sep 83

5 DATE APPROVED: 7 Oct 83

6 PHOTOGRAPHY AVAILABLE: [X] YES [ ] NO

7 GROUND POINT ELEVATION

A CDS: 420'

B EQUIPMENT: 420'

C. PERSONNEL: 426'

D. HIGHEST: 449'

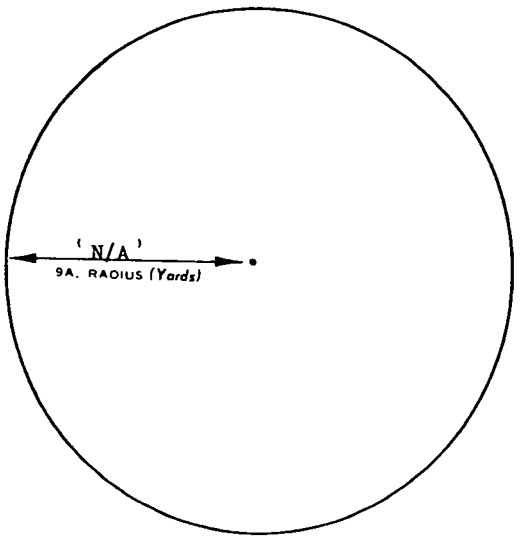
8 LOW LEVEL ROUTES

ROUTE NAME/DESIGNATOR: SR-21

[ ] NONE AVAILABLE

COVER LETTER FOR TIMING LIGHTS 5 JAN 84

9 CIRCULAR DZ



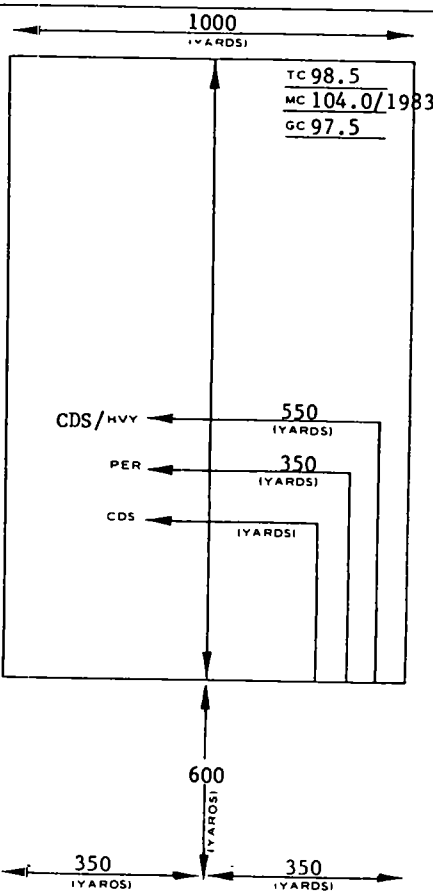
9B CENTER MASS

(1) LATITUDE AND LONGITUDE (Degrees, minutes and seconds): N 35° 05' 59" W 79° 19' 50"

(2) UTM COORDINATES: 5217 8517

9C. REMARKS

10. RECTANGULAR DZ



A. CORNERS OF DZ

LEFT LEADING EDGE: 5149 8573

RIGHT LEADING EDGE: 5136 8483

LEFT TRAILING EDGE: 5298 8551

RIGHT TRAILING EDGE: 5285 8460

B. TIMING POINTS

LEFT: 5093 8567

RIGHT: 5083 8504

C. POINTS OF IMPACT

CDS: 5192 8520

PER: 5174 8523

HVY: 5192 8520

D. TRAILING EDGE CENTER LINE: 5292 8505

E. LEADING EDGE CENTER LINE: 5142 8528

F. POINT OF ORIGIN:

G. REMARKS

SPHEROID: CLARKE 1866

ZONE 17

EASTING 600,000

NORTHING 3,800,000

MAC FORM MAY 83 339 PREVIOUS EDITION IS OBSOLETE

Figure 16-11. Example of completed MAC Form 339.

CHAPTER 17

MALFUNCTIONS REPORTING

The investigation of personnel, parachutes, and equipment malfunctions receives the highest priority secondary only to medical aid for the injured. It supersedes all other aspects of the operation to include ground tactical play. Prompt and accurate investigations and reporting could save lives and equipment. The report provides data to determine if a system or procedural training change is necessary to prevent future occurrences. The malfunction officer (MO) is subordinate to the DZSO and is a member of the drop zone support team. Any assistance required by the MO must pass through the DZSO/DZST, who has control of the DZ.

17-1. MALFUNCTION OFFICER

The organization that provides the air items normally provides the malfunction officer.

a. The duties of the MO include the following:

(1) As a member of the DZST, he must be present on the DZ or extraction zone during all personnel and equipment drops. He tags equipment and initiates reports.

(2) The MO has the following equipment during duty performance:

(a) Radio for communication with the DZ command post.

(b) A camera to take photographs of malfunctions or incidents. Photographic equipment is essential for the proper performance of MO duties. Pictures of malfunctions assist in investigations.

(c) Binoculars or ~~night~~ daytime (Rec chg 1 25 June 91) vision devices.

(d) Transportation to move around the DZ.

(3) The MO performs the following actions if a malfunction occurs:

(a) Conduct an on-site investigation of the cause(s) of the malfunction.

(b) Take photographs that show possible cause(s) of the malfunction.

(c) Secure, identify, tag, and number airdrop equipment in-

volved in the malfunction incident.

b. If a partial malfunction occurs, the MO records the number and type of malfunction (see AR 59-4). He obtains a statement(s) from the parachutist(s) to include name, unit, stick number, previous jump experience, type of aircraft, and details of the malfunction. This investigation activity should not interfere with the jump activities planned by the tactical unit during mass tactical personnel jumps. If warranted, the MO performs any subsequent investigations from this information.

c. The MO obtains statements from the parachutists and jumpmaster if a total malfunction occurs during personnel jumps where there are no injuries. He gathers additional statements from ground observers, other parachutists, and aircraft personnel to determine the cause.

d. If serious injuries or death result from a parachute jump, the MO requests the DZSO to place the impact site off limits and to post a guard so as not to interfere with medical support.

e. The MO photographs the parachutist, the impact site, and any obvious defects in the equipment (including any damage caused by the impact). He then performs the following:

(1) If the parachute harness must be removed from the individual, records where the parachute harness or component was cut. Medical personnel dictate the method or removal of the parachute harness.

(2) Takes immediate possession of the parachute log record. Limits access to this document to appointed investigation officers.

(3) Requests that medical personnel secure and preserve all clothing and equipment with the parachutist that is removed from the impact site.

(4) Assumes responsibility for all items and personal equipment to include the parachutist's weapon.

(5) Takes statements from the preceding parachutists, subsequent parachutists, jumpmaster, ground observers, and other parachutists or aircraft personnel able to provide facts.

(6) Records the name and unit of any personnel who observed the incident, even if information is not new to the investigation.

(7) Secures a copy of the jump manifest and reconstructs the jump stick from personnel present, if required.

(8) Conducts a detailed, component-by-component examination of all equipment after the parachutist has been evacuated.

(9) Sketches the impact site in relation to the DZ and marks the im-

pact location of the parachutist and equipment.

(10) Requests the DZSO/DZSTL to notify the DACO so that the aircrew of the aircraft involved can inspect, upon landing, for any defects or damage that may have contributed to or caused the malfunction. Requests the segregation and identification of parachute deployment bags from those of other aircraft.

(11) Obtains the deployment bag serial number from the parachute log record. Retrieves and secures the deployment bag with the parachute assembly until the investigation is completed.

(12) Ensures the parachute is loosely rolled, tagged, and bagged when completing the on-site investigation; does not remove parachute entanglements.

(13) Ensures evacuation of all equipment to an area where it is subjected rigger inspection IAW TM 10-1670-201-23/TO 13C-1-41.

(14) Turns over to the DZSO/DZST any organizational and personal clothing, weapons, and equipment believed not to be the probable cause of the malfunction for return to the parachutist's unit.

17-2. INVESTIGATIONS

The depth of any investigation varies according to the severity of the malfunction and resultant injuries. In cases apparently not involving death or serious injury, the MO conducts the on-site investigation solely to prevent future occurrences.

a. In cases involving death or serious injury, the MO conducts a follow-on investigation according to service directives. His investigative notes, insights, reports, and physical evidence are made available to these investigations.

b. The MO exercises care so the government is not placed in an unfavorable position by compromising the rights of involved personnel. During the investigation, he gathers items of information and evidence that are sensitive in nature, ensuring that the information pertaining to the investigation is given to authorized personnel on a need-to-know basis.

17-3. REPORTING DATA

All data gathered initially from the DZ and immediately after by the MO must pass through the DZSO/DZSTL before transmitted to the control group. This feeder information is normally discussed between the DZSO/DZSTL and the MO immediately after the jump is complete.

NOTE: The MO uses DD Form 1748-2 to report all airdrop malfunctions (see AR 59-4).

PART FIVE

SPECIAL AIRBORNE PROCEDURES

CHAPTER 18

ADVERSE WEATHER AERIAL DELIVERY SYSTEM

AWADS is a navigational system installed in USAF C-130 aircraft. It enables the aircraft to fly to a DZ during reduced visibility, and provides flexibility to the airborne force commander in the accomplishment of all airborne missions. AWADS is effective in large, joint operations; tactical reinforcements; and specialized missions.

18-1. MULTIPLE MISSION SUPPORT

AWADS operations facilitate rapid, continuous aerial deployment and resupply in adverse weather or darkness. Units can execute a parachute assault without a prepositioned AFCCT or an Army assault team. As a result, time (length) of the air formation is shortened, and the air corridor must be cleared only once by tactical air, which heightens the element of surprise. AFCCTs are introduced with the assault elements and can assist the ground force commander with additional low-altitude parachute extraction system, CDS, airlanding, or HD missions. AWADS enables a commander to conduct rapid, vertical reinforcement of units that are threatened by enemy penetration during instrument meteorological conditions/visual meteorological conditions.

NOTE: A minimum ceiling of 200 feet and a minimum visibility of 1/2 mile for personnel and equipment are imposed for tactical training.

18-2. TRAINING AND PREPARATION

An AWADS operation demands detailed planning, rehearsal, training, and coordination between USAF and Army units to be effective. Due to limited visibility in the air and during assembly on the ground, AWADS requires both technical training and psychological preparation of the parachutists. AWADS sustained

(prejump) training requires modification to jump conditions which parachutists are accustomed to.

18-3. MODIFIED JUMPMASTER DUTIES

The jumpmaster relies on the loadmaster to obtain and relay en route information. Under AWADS conditions, the jumpmaster still attempts to perform all of the required checks. He may not be able to make positive DZ identification or to observe safety hazards beyond the immediate area of the door. An additional 10-second time warning is required when jumping under AWADS conditions.

18-4. MODIFIED PARACHUTIST ACTIONS

Parachutist actions during descent under normal conditions must be modified in AWADS training. Modifications are made when using the T10-C and MC1-1B/C parachutes.

a. **T-10C Points of Performance.**

(1) *Check the body position and count.*

(2) *Check the canopy.* (Any malfunction under these conditions requires activation of the reserve since the parachutist cannot effectively judge rate of descent.)

(3) *Keep a keen lookout during descent.*

(4) *Do not slip, except to avoid collisions, until after breaking through the clouds.*

(5) *Give lower canopies the right of way; higher canopies slip to avoid them.*

(6) *Recheck the canopy.* (Make this check after breaking through the clouds if the canopy could not be checked while in the clouds.)

(7) *Prepare to land.* (Do not release equipment until the ground can be seen and it is clear below.)

(8) *Land.* (Execute a proper PLF).

b. **MC1-1B/C Points of Performance.**

(1) *Check the body position and count.*

(2) *Check the canopy.* (If the orifice is to the front, there is a complete inversion. DO NOT activate the reserve since the canopy can still be controlled. For any other malfunction, activate the reserve immediately.)

(3) *Identify steering toggles.* (Grasp each one and bring them both to chest level. This is called "breaking," which reduces lateral movement, helping to eliminate midair collisions and extreme dispersion due to excessive drift.)

(4) *If either or both toggles are broken, steer the canopy by pulling a slip with the rear riser on the side of*

the intended turn. (In the clouds, anyone with a broken toggle and not applying "brakes" automatically has a greater lateral drift than anyone else and must keep alert during descent.)

(5) *Keep a keen lookout during descent.* (During reduced visibility, prepare to take evasive action.)

(6) Give lower canopies the right of way. (If parachutists see the possibility of converging at any altitude and from any direction, they immediately turn away from each other by pulling the toggle that is away from the other parachutist.)

(7) *Recheck canopy.* (Perform a thorough canopy inspection after breaking through the clouds. Release the toggles when the ground is in sight and prepare equipment for landing. Use the lowering lines.)

(8) *Prepare to land.* (Turn into the wind 75 to 150 feet above the ground. Obstacles spotted when coming out of low clouds normally require rapid preparation for the appropriate emergency landing.)

(9) *Land.* (Execute a proper PLF.)

CHAPTER 19

DELIBERATE WATER OPERATIONS

Units conducting water DZ operations should use the following procedures as a guide to ensure the mission is conducted safely. All jumps should be conducted under the following conditions:

- **Daylight only (warm weather conditions).**
- **Suface winds should not exceed 13 knots.**
- **Drop control (ground) visual marking system.**
- **Helicopter flying under visual flight conditions.**
- **Wind conditions should permit operation on the water DZ.**
- **Only one parachutist will jump for each recovery boat for each pass.**

19-1. PERSONNEL AND EQUIPMENT

The following personnel and equipment are required for deliberate water operations.

a. **Personnel**

(1) Medics with ambulance and resuscitator.

(2) Briefing (for water DZ operations) by DZSO and DZ control personnel.

(3) RB-15 boats, or the 14-foot engineer assault boats, or civilian equivalent boats with motors. If available, hard body boats should be used.

(4) Communications equipment, including boat-to-boat, boat-to-air, and ground communications.

(5) Minimum of one safety swimmer for each boat.

(6) All parachutists are swim-qualified and briefed.

(7) All parachutists are equipped with life preservers.

b. **Mission Control Personnel.**

(1) DZSO.

(2) Jumpmaster.

(3) Safety swimmers (one for each boat).

(4) Boat operators (one for each boat).

(5) Boat commanders (one for each boat).

(6) Medical aidman.

c. **Mission Logistics and Support.**

(1) UH-1 helicopter.

(2) Equipment for safety swimmers.

(3) Equipment for recovery and command boats.

(4) Serviceable boats and motors.

(5) Required panels and smoke.

(6) Required communications equipment to include spare batteries and one complete spare radio set.

(7) Floating, nonflammable container with suitable anchor for smoke grenades.

(8) First-aid equipment to include resuscitator.

(9) Bailing cup.

(10) Motor tie-down rope.

(11) Sheath knife (boat commander).

(12) Pliers.

(13) Extra B-7 life preserver for emergencies.

(14) Life jackets or life preservers for personnel on board (5).

(15) Shear pins for motor (2).

(16) Oars or paddles (4).

(17) AN/PRC-77 radios (complete) with extra batteries for each boat.

19-2. ORGANIZATION AND EQUIPMENT OF DZ DETAIL

The organization and equipment of the drop zone detail include the following:

a. Command (No. 1) boat includes the following personnel and equipment.

(1) *Personnel.*

- DZSO.
- Boat commander.
- Boat operator.
- Safety swimmer with equipment.
- Medical aidman.

(2) *Equipment.*

- Marker panels.
- Aid kit.
- Resuscitator.

- Boat hook.
- AN/PRC-77 radio (complete) with extra battery.

b. Recovery boats include the following personnel and equipment.

(1) *Personnel.*

- Boat commander.
- Boat operator.
- Safety swimmer (with equipment).

(2) *Equipment.*

- Boat hook.
- Bailing cup.
- Motor tie-down rope.
- Sheath knife, boat commander.
- Pliers.
- Life jackets or life preservers for personnel on board (5).
- Extra B-7 life preserver for emergencies.
- Shear pins for motor (2).
- Oars or paddles (4).
- AN/PRC-77 radio (complete) with extra battery.

(3) *Safety swimmer equipment.*

- Swim fins (one pair).
- Face mask.
- Snorkel.
- Sheath knife.
- Life vest.
- Wet suit (optional).

(4) *DZSO radio vehicle personnel.*

- Parachute operation officer in charge.
- Driver.

NOTE: The parachute operation OIC briefs parachutists, aircrew, jumpmaster, and DZ control party regarding water DZ operations.

(5) *DZSO (additional duties).*

(a) Briefs boat crews and safety swimmers on the following:

- Overall organization of water DZ.
- Number of lifts and personnel to be dropped.
- Drop altitude and aircraft heading.
- Ground winds.
- Turn-around time between drops.
- Recovery procedures.
- Communications plan.
- Emergency recovery and evacuation plan.

- Applicable special instructions.

(b) Maintains visual observation of all parachutists until safely recovered.

(6) *Jumpmaster.*

(a) Performs the duties of a jumpmaster.

(b) Helps recover personnel from the water (with the helicopter) in an emergency.

(c) Keeps parachutists under observation until safely recovered.

(7) *Boat commander.*

(a) Ensures all personnel and equipment are on board.

(b) Ensures that all equipment is operational.

(c) Ensures that the boat commander and safety swimmer have been briefed and understand instructions.

(d) Maintains visual observations of parachutists from time of exit to safe recovery.

(e) Controls actions of boat operator and safety swimmer.

(8) *Safety swimmer.*

(a) Is alert at all times for parachutists in trouble and is prepared to enter the water to assist parachutists.

(b) Enters water (on order of boat commander) and assists parachutist recovery.

(9) *Medical aidman.*

(a) Ensures that resuscitator is complete and in operational condition.

(b) Ensures that safety personnel understand proper use of the resuscitators and applicable lifesaving techniques.

(c) Uses applicable medical equipment and provides required first-aid treatment and medical evacuation.

19-3. SAFETY

Units conducting water DZ operations should use the following procedures as a guide to ensure the mission is conducted safely. Water DZ parachute jumps should be conducted under the following conditions:

- Daylight only (warm weather conditions).
- Surface winds not in excess of 13 knots.
- Drop control (ground) visual marking system.
- Helicopter flying under visual flight conditions.

- Wind conditions permit operation on the water DZ.
- No more than one parachutist jumping for each boat for each pass.

19-4. JUMP RECOVERY PROCEDURES

After parachutists enter the water, recovery boats (Nos. 2 and 3) proceed to the location of designated parachutists (one parachutist is assigned for each recovery boat) and begin recovery operations.

a. **Boat Commander.** The commander of each recovery boat identifies his assigned parachutist as soon as possible.

(1) The boat commander determines whether the parachutist's life preserver (B-7) has been inflated. If the life preserver has not inflated, the recovery boat commander immediately proceeds to the parachutist's impact point, taking care to stay out of the way of the other parachutists. Upon reaching the assigned parachutist, the boat commander treats the situation as a parachutist in distress and takes appropriate action.

(2) The DZSO's command boat (No. 1) is located so the DZSO can observe the landing of parachutists and is in position to reinforce either boat Nos. 2 or 3 with additional safety swimmers and a resuscitator, as required.

(3) The following procedures are used for recovery operations:

(a) When possible, recovery boats approach parachutists from the upwind side.

(b) If after impact the parachutist experiences no difficulties, he activates his canopy release assemblies and signals ALL OK by raising one arm straight up (without waving).

NOTE: Any other signal, or no signal, by the parachutist is considered by the recovery boat commander as a distress situation and immediate, appropriate action is taken.

(c) The boat commander directs the boat alongside the parachutist and extends the boat hook so that it can be grasped by the parachutist (or, in the event of distress, to secure a portion of the parachutist's equipment with the hook).

b. **Safety Swimmers.** The safety swimmer enters the water (on instructions from the boat commander) alongside the parachutist to assist the parachutists required and to recover the parachute canopy and other equipment. If a parachutist has gone underwater, the following will be accomplished (as applicable):

(1) Red smoke is displayed to indicate an emergency and all other activities cease.

(2) The safety swimmer dives to recover the parachutist, cutting him free of equipment.

(3) The DZSO moves his boat to the scene and prepares to use the resuscitator.

c. **Recovery Helicopter.** The helicopter (jump aircraft) is alerted to stand by to assist in emergency recovery operations.

(1) When directed by the DZSO, the pilot hovers near the location, and the jumpmaster hooks or ties a portion of the submerged parachutist's equipment on a skid. The pilot can pull the parachutist from the water. Medical evacuation is by air.

(2) After normal recovery operations, parachutists and equipment are unloaded at the assembly area, and all boats are repositioned for the resumption of jump operations.

19-5. DROP ZONE PREJUMP TRAINING (UH-1)

Prejump training for water jumps should be conducted on the same day of the scheduled jump.

a. The training includes, but is not limited to, the following:

(1) Six points of performance for water jumps.

(2) Emergencies in the air.

(3) Emergencies in the water.

(4) Recovery procedures.

(5) Orientation at the water DZ.

(6) Special instructions.

b. The mission coordination briefing should be conducted following prejump training. Prejump training includes demonstrations and practical exercises for all parachutists using the suspended harness.

(1) Maintain proper body position and count.

(2) Check canopy.

(3) Inflate B-7 life preserver.

(4) Keep a keen lookout during descent, and maneuver to indicated impact area.

(5) Prepare to land by turning and facing into the wind, maintaining position until just before landing.

(6) Prepare to make a PLF (if shallow water or ground contact).

c. Upon landing, parachutists must be prepared to perform the following:

(1) Activate one (or both) canopy release assembly after entering the water.

(2) Prevent fouling in the canopy or suspension lines – for example, severe wind conditions.

(3) Signal ALL OK or HELP to the recovery boat.

(4) Stand by for pickup; remain calm.

d. The parachute operation OIC ensures that all personnel scheduled for a water jump are swim-qualified and have completed the required prejump training.

CHAPTER 20

EXIT PROCEDURES

Two types of exit procedures can be used on USAF aircraft: ADEPT exit and mass exit.

(See chg 1 25 Jun 91)

20-1. ALTERNATE DOOR EXIT PROCEDURE FOR TRAINING

ADEPT is used when jumping the MC1-1B/C parachute. This is a training safety measure that allows the maximum number of parachutists to exit the aircraft with a minimum risk of high-altitude entanglements.

a. **ADEPT Option 1.**

(1) During a single pass over the drop zone, only one stick of parachutists on one side of the aircraft jumps. When the jump caution lights turn green, the jumpmaster (on the active side for the pass) issues the ninth jump command GO to the first parachutist by tapping him on the thigh. He then backs away to the middle of the aircraft, ensuring he is out of the way of the safety and parachutists. He controls the flow of parachutists (performing a visual inspection of each parachutist, his static line, and his equipment as he approaches the door) and observes the jump caution lights, while his safety NCO takes the static lines.

(2) Once the last parachutist exits the active door, the safety NCO visually clears to the rear, gives the loadmaster a thumbs up signal, and, with the assistance of the loadmaster and or static line retriever, pulls in the static lines and deployment bags.

(3) The jumpmaster in the inactive door during the pass performs outside air safety checks, spots for and identifies the drop zone, then observes the actions in the active door, since (under this option) he will not have any parachutists exiting his door.

(4) Subsequent passes alternate from door to door until all parachutists have exited. Once all parachutists have exited the assistant jumpmaster's door, the primary jumpmaster begins exiting parachutists from his door. The assistant jumpmaster is the last parachutist on his side of the aircraft. The primary jumpmaster is the last parachutist onboard the aircraft and exits from his door.

b. **ADEPT Option 2.**

(1) During a single pass over the drop zone, one stick of parachutists exit from the primary jumpmaster's door, followed by a stick of parachutists from the assistant jumpmaster's door. When the jump caution lights turn green, the primary jumpmaster issues the ninth jump command GO to his first parachutist by tapping him on the thigh. He then backs to the middle of the aircraft out of the way of the safety and parachutists. He controls the flow of parachutists (performing a visual inspection of each parachutist, his static line, and equipment as he approaches the door) and observes the jump caution lights, while the safety NCO takes the static lines.

(2) The assistant jumpmaster observes the actions in the primary jumpmaster's door. When he sees only three parachutists remaining in the primary jumpmaster's stick, he faces his parachutists and issues the eighth jump command. When the assistant jumpmaster sees the last parachutist clear the jump platform in the primary jumpmaster's door, he turns and rechecks his jump caution lights. (The primary jumpmaster is now observing the actions in the assistant jumpmaster's door).

(3) If the jump caution lights are still green, the assistant jumpmaster issues the ninth jump command GO to his first parachutist by tapping him on the thigh. He then backs to the middle of the aircraft out of the way of the safety and parachutists. He controls the flow of parachutists (performing a visual inspection of each parachutist and his equipment as he approaches the door), and observes the jump caution lights, while the safety NCO takes the static lines.

(4) When the last parachutist exits from his side of the aircraft (last pass), the assistant jumpmaster gives his static line to the safety NCO, takes up the door position, rechecks the jump caution lights, and, if they are still green, he exits. The primary jumpmaster, seeing assistant jumpmaster exit, passes his static line to the safety NCO, takes up the door position, rechecks the jump caution lights, and, if they are green, he exits.

(5) Safety personnel visually clear to the rear of the aircraft and give the loadmaster a thumbs up signal. They assist the loadmaster to recover static lines and deployment bags.

20-2. MASS EXIT

This exit procedure is used only when jumping the T-10C parachute. During this type of exit, parachutists may exit from both doors simultaneously.

CHAPTER 21

BUNDLE DELIVERY SYSTEM (WEDGE)

The bundle delivery system (referred to as a wedge because of its shape) is constructed with two Type II, 8-foot, modular airdrop platforms; a lightweight aluminum frame; four sections of skate wheel roller conveyors; and bundle release assemblies. The wedge weighs 930 pounds. It is designed to lock into the ramp restraint rails and to provide adequate tie-downs to secure various configurations of A-series containers (A-7A and A-21) for flight. When positioned on the raised cargo ramp in flight, it provides an inclined platform so that bundles can be released by rolling them out and off the ramp immediately before or after parachutists exit the doors.

21-1. APPLICATION

The wedge provides minimum dispersion between parachutists and equipment bundles on a single pass over the drop zone. The bundles can be released individually or in any group combination from the wedge when the loadmaster pulls the release pins from one or more release plates, depending on the number of bundles to be released at one time. Each release plate system employs a 1/8-inch-diameter steel release pin, restraint release plate, and 1-inch-wide tubular nylon restraint strap that secures each bundle, or each combination of bundles, to the wedge. A 1-inch-wide tubular nylon strap lanyard is attached to each steel release pin. Releasing the restraint strap allows the bundle(s) to roll off the aircraft ramp under the force of gravity.

21-2. RESTRICTIONS

The wedge accommodates six A-7A and or A-21 aerial delivery bundles aboard the C-130 for cargo ramp airdrop, and limits parachutists to 20 per door. (The anchor line cable stops are positioned about 26 inches forward of the center anchor line cable supports.)

NOTE: Wedge bundles can only be dropped on the first pass across the drop zone.

a. Bundle sizes are limited to 27 inches by 42 inches by 48 inches to include parachutes, and a total rigged weight of 538 pounds. Maximum allowable weight is 3,228 pounds for each six bundles—for example, maximum dimensions for mortar bundles are 27 inches long by 60 inches wide by 27 inches high (height dimension does not

include the cargo parachute, paperboard honeycomb, and skid board). Mortar bundles must weigh between 320 pounds and 538 pounds (weights include skid board and cargo parachute). These dimensions allow up to three mortar bundles to be configured on the wedge, or mortar bundles can be mixed with smaller (27 inches by 42 inches) bundles to facilitate cross loading. Two configurations are possible when mixing bundles: one mortar and four normal-size bundles (27 inches by 42 inches) or two mortar and two normal-size bundles.

b. During tactical training (visual or instrument flight regulations), bundle drops are restricted to the first three aircraft.

21-3. RIGGING PROCEDURES

Aerial delivery units usually rig the wedge; however, the system may be in the airborne unit area. The areas of responsibility overlap; therefore, the jumpmaster must be familiar with the rigging procedures.

21-4. BUNDLE DROP SEQUENCE

Bundles may be dropped from the wedge in the following sequence:

- A single bundle before and after the parachutists exit.
- A single unit of two to three bundles before or after the parachutists exit.
- Two units of two or three bundles for each drop with one unit dropped before and one unit after the parachutists exit.

The bundle sequence is determined before loading time on the wedge. If single bundles are to be dropped, a restraint strap and release lanyard are required for each bundle. If multiple bundles are to be dropped in units of two or three, a restraint strap and release lanyard are required for the aft bundle in each unit (FM 10-501/TO 13C7-1-11). Three exceptions are:

a. **A-7 and A-21 bundles.** The skid board size is 27 inches by 42 inches by 3/4 inch. Drill the skid board and center a 1-inch hole on the 42-inch side, 1 inch from the edge. Place two layers of honeycomb the size of the bundle on the skid board.

b. **Bundle restraint strap.** A restraint strap is formed by cutting a 12-foot length of 1-inch-wide tubular nylon webbing (requirement for maximum-size bundle). Form a 6-inch loop, with an overhand knot, 3 feet from one end of the strap. Lay the tie across the honeycomb with the loop next to the center hole in the skid. The 3-foot length of strap should be at the front of the skid (the front is the side with the 1-inch hole nearest the edge). Place the bundle on top of the honeycomb and rig the bundle (FM 10-501/TO 13C7-1-11). Place the running ends of the restraint strap on top of the rigged bundle in preparation for loading on the wedge.

c. **Cargo parachutes.** Use G-14 cargo parachutes, rigged with nonbreakaway static lines without drogue for A-7A or A-21 bundles dropped from the wedge. Attach the parachutes to the bundles after they are loaded aboard the wedge and restraint straps are secured.

21-5. INSPECTION

The wedge is inspected, before loading the bundles, for completeness and serviceability and to ensure that the roller conveyors are properly positioned and secured to the platform. The bundle release plates are correctly installed as follows:

a. Install left-side release plates (three each) between roller conveyors 1 and 2 at rollers 1, 2, 11, and 12, 21, 22, counting from the front to the rear of the wedge.

b. Install right-side release plates between roller conveyors 3 and 4 at roller positions 1, 2, 11, and 12, 21, 22.

c. Install a 1-inch-wide tubular nylon webbing release lanyard with a 5 3/4-inch by 1/8-inch steel pin and ensure it is serviceable, marked, and secured to the correct release plate with a 20-inch length of Type III nylon cord. (The 20-inch cord forms a safety to prevent rebound of the lanyard and possible injury to personnel releasing the bundles.)

NOTE: If a lanyard is unserviceable, make a new one with a length of 1-inch tubular nylon webbing and 5 3/4-inch by 1/8-inch steel pin. Attach the pin to one end of the webbing, using a bowline knot. Insert the pin in the appropriate release plate hole and extend the webbing forward to a point 30 inches forward (of the forward edge) of the wedge. Cut the webbing and form a 6-inch loop in the running end to provide a secure handhold for releasing the bundles.

21-6. BUNDLES LOADED, RIGGED, AND RESTRAINED TO WEDGE

Bundles are loaded, rigged, and secured to the wedge at the rigging site, and then transported to the aircraft for loading. The following procedures are for loading and rigging bundles to be dropped individually.

a. Load bundle No. 3, left unit, with the loop of the restraint strap forward.

b. Position the loaded skid board with the 1-inch hole centered over the hole in the forward release plate. Pass the 6-inch loop of the restraint strap down through the hole in the board and release plate. Insert the release lanyard pin through the restraint strap loop and the hole in the release plate.

c. Form a loop in the forward running end of the restraint strap. Pass the forward running end of the restraint strap through the loop, cinch the strap tight around the bundle, and secure with two half hitches and an overhand knot.

d. Secure the release lanyard pin with one complete turn (attach cotton ticket No. 8/7). Pass the cord down through the hole in the release plate and through the pin loop and tie the

running end with a square knot and a locking knot.

NOTE: Repeat the above procedures for each bundle in the following sequence: bundles No. 2 and 1, left side; bundles Nos. 3, 2, and 1, right side.

e. Position, attach, and secure G-14 cargo parachutes to the bundles. Using tie-down straps, secure the bundles to the wedge to prevent movement and possible damage to the release pin during transport and to the wedge when loading aboard the aircraft.

NOTE: If bundles are to be dropped in multiples of two or three, only the aft bundle requires a restraint strap and release lanyard. Bundles are loaded on the wedge in reverse order – left to right, front to rear – with the loop of the restraint loop strap forward.

21-7. JUMPMASTER PROCEDURES

Jumpmaster procedures include managing anchor line cables, and inspections before and after loading.

a. **Anchor Line Cables.** The jumpmaster ensures –

(1) That anchor line cables are disconnected from the center anchor cable supports and secured to preclude obstruction to personnel.

(2) That the stops are installed and taped on the inboard anchor line cable at fuselage station 749 for the bundle static lines, and about 26 inches forward of the center anchor cable support for parachutist static lines.

NOTE: Static line retrieval spools are forward of these stops. The stops and spools are adjusted so that the distance from the forward edge of the anchor cable supports to the forward edge of the spool is 26 inches.

b. **Inspection Before Loading.** The jumpmaster is responsible for inspecting, with a qualified parachute rigger, the following items on the wedge before loading. (He also inspects them with the loadmaster after loading.)

- Bundles (FM 10-501/TO 13C7-1-11) A-71 or A-21 are present and are properly secured to plywood skid board.
- Quick-release assemblies are properly seated and safety clip is inserted (A-21 bundle).
- Correct size and layers of honeycomb are present.
- Bundles properly secured to plywood skid board.
- A 1-inch tubular nylon restraint strap is routed vertically around bundle(s) with a 6-inch lanyard overhand loop at the release point.
- G-14 cargo parachute(s) is rigged for nonbreakaway and without drogue.
- Parachute is properly attached and secured to bundle(s).

c. **Inspection After Loading.** The jumpmaster is responsible for inspecting the wedge for correct positioning

and locking into the aircraft restraint rails when the following are accomplished.

(1) The wedge is positioned so that aft restraint rail lock in platform No. 6 indent is in place (counting from the rear of the platform).

(2) The cargo parachute static lines are connected to the inboard anchor line cables forward of the stops at station 749.

(3) The bundle release lanyards are correctly routed.

(4) The release pins are seated in the release plates.

(5) The safety tie is in place.

(6) The bundles are secured for flight.

21-8. BRIEFING RELEASE PROCEDURES

Briefing release procedures include the following:

a. Identify the jumpmaster, loadmaster, safety personnel, and assistants, and brief each individual on his responsibilities.

b. Coordinate type signals to be used to conduct the drop—for example, thumbs up for DROP, thumbs down for NO DROP.

c. Coordinate bundle release and parachutist exit sequence to be used—for example, on the green light, the No. 1 loadmaster releases bundle(s) on his side of the aircraft. All parachutists will exit after the last bundle clears the aircraft ramp. After the last parachutist exits the aircraft, safety personnel give a thumbs up signal for the No. 2 loadmaster to release the bundles on his side of the aircraft.

d. Review procedures for a bundle(s) hung up in the aircraft—for example, the loadmaster will signal NO DROP and notify the pilot (who turns on the NO DROP red light). The drop is cancelled if the problem cannot be readily identified and safely corrected.

21-9. DUTIES DURING FLIGHT

Airdrop sequence of bundles and personnel include:

a. At the 3-minute slowdown, the loadmaster raises the cargo door and installs the anchor line cables in the center anchor line cable supports.

b. The jumpmaster hooks up, issues the 6-minute warning, and begins the jump commands.

NOTE: All commands are the same (whether using the wedge or not) unless all bundles are to be released before the exit of the parachutists. Then, the command STAND BY is given. The No. 1 parachutist in each door assumes a position at a 45-degree angle to the forward edge of the doors and observes the jumpmaster. The command STAND IN THE DOOR is given when parachutists exit before the bundles are dropped.

c. On the green light, the loadmasters release the bundles. When the

jumpmaster observes that the last bundle has cleared the aircraft ramp, he gives the command GO. All parachutists then exit in the prescribed manner for a C-130 aircraft.

d. If all bundles are to be released after the parachutists exit, the jumpmaster gives the command for the first two parachutists STAND IN THE DOOR(S). On the green light, the command GO is given. When the parachutists have exited, the static safety personnel give a thumbs up signal for the loadmaster to release the bundles.

e. If the bundles are to be released before and after the exit of parachutists, upon completion of SOUND OFF WITH EQUIPMENT CHECK, the command STAND BY is given, and the No. 1 parachutist in each door awaits the jumpmaster's command.

f. On the green light, the No. 1 loadmaster releases the required bundles. When the jumpmaster observes that the last bundle has cleared the aircraft ramp, he gives the command GO. All parachutists then exit, and the static safety personnel signal thumbs up to the No. 2 loadmaster to release the remaining bundles. Static lines are retrieved, and the cargo and troop doors are secured by the loadmaster.

CHAPTER 22

COMBAT AIRBORNE OPERATIONS

This chapter describes combat airborne operation techniques that cannot be used in peacetime tactical training due to safety restrictions. Commanders must brief, rebrief, and ensure each soldier backbriefs not only his assembly plan and assault objective, but also those of other units operating near his unit. Every trooper must know the scenario so that if he is misdelivered, he can still exercise his initiative to help accomplish the mission. Only those unit assembly aids briefed can be used, otherwise confusion can result.

22-1. PERSONNEL AND EQUIPMENT PROCEDURES

Personnel and equipment can be dropped in any sequence that best supports the ground tactical plan. Commanders may disregard peacetime aircraft, serial, and formation interval rules.

a. All aircraft are loaded to the maximum.

b. The right snap connector of the reserve parachute has no safety wire.

c. The waistband is rolled up and secured with a piece of masking tape to keep it out of the way.

d. Light ALICE packs are used. Only necessities are carried such as water, ammunition, food, razor, toothbrush, and change of socks. Items that may be needed quickly are never taped down.

e. After the flight crosses into enemy territory or approaches enemy air defense missile/gun systems, jumpmasters stand up and hook up the troops. If it is a long way to go after hookup and equipment checks, parachutists sit on the floor; static lines are tightened after they stand up again. Therefore, if an aircraft is hit, the parachutists can immediately exit.

f. The green light goes on at the edge of the DZ. There is no safety (buffer) distance. Parachutists continue to exit on red light until all jump. The red light does not go on unless the same aircraft is scheduled to continue to another (different) DZ.

g. The weapons are rigged (magazine is loaded, on SAFE, and no round is chambered) in the M1950 weapons case. Handles of hand grenades are

bent down to prevent falling off when the parachute opens.

h. There are no safeties – each trooper is his own safety. All troops on board jump. (rec chg 1 25 June 91)

i. The jumpmaster and assistant jumpmasters jump in that part of the stick where they can land with their assigned unit.

(rec chg 1 25 June 91)

j. The No. 1 man, middle man, and last man of every third aircraft should carry smoke grenades. As soon as they are out of their harnesses and before they depart the PLF point, they pop their smoke grenades. This provides continuous smoke to indicate wind direction of subsequent parachutists.

k. All parachutists "pop and go," leaving all their air items where they land. If the DZ is under enemy attack and it is necessary to find cover and start fighting, the harness is left on. Personnel drop weapons cases and reserves, activate both canopy release assemblies, grab the weapon, and start running off the DZ. The harness can be discarded later.

l. Towed parachutists are automatically cut free. The jump doors are closed immediately so the aircraft formation can pick up speed to escape and evade back to friendly lines.

m. Drop altitude is determined between the airborne commander and the air mission commander using Part 3 of this manual as a guide. The JTF commander makes the final jump altitude decision.

n. Regardless of type parachute, ADEPT or any other form of controlled exits are not used. T-10B and MC1-1B/C parachutes may be mixed in any order, in any aircraft, day or night.

o. At the jumpmaster's command STAND IN THE DOOR, all parachutists close up as tight as possible. At the green light, all parachutists exit "at the double."

p. Leaders jump their own radios. Radio frequencies should be present, short whip antennas should be screwed in, and handsets plugged in. Leader radios are ready to go immediately after landing.

q. SOIs must be sanitized so only the most essential information is carried by any one person. SOIs must be secured to the parachutist by a strong cord.

r. Maps should not include any graphics. Leaders must memorize key graphics before the assault. No maps or operations schedules that might be captured should reveal the operations plan.

22-2. SPEED DURING ASSAULT

The sooner assault objectives are secured, the better the odds for a successful mission. Units should not wait in assembly areas until 80 percent, 90 percent, or 100 percent of the unit is assembled.

a. Determine before the jump the minimum number of troops required to seize and secure the assault objective. When that number of men have assembled (to include any "lost" troopers from other units), the senior personnel of the group strikes out for the assault objective.

b. Leave behind a two-man buddy team to inform leaders and other troopers from the unit who reach the assembly area later "where everybody went."

CAUTION: DO NOT MOVE OUT OF THE ASSEMBLY AREA WITHOUT A RADIO. IF THE GROUP IS ENGAGED IN A FIREFIGHT EN ROUTE TO OR AT THE ASSAULT OBJECTIVE, RADIO HIGHER HEADQUARTERS AS TO THE TACTICAL SITUATION.

22-3. LANDING PLAN

The development of the landing plan must be thorough. Cross load and select assembly areas. Develop a heavy drop (HD) plan. Multiple HD impact points along the length and across the width of the DZ are necessary.

a. Vehicle drivers and equipment operators should land in the same sector of the DZ where the impact point for their equipment is located. Spread out the HD along the entire DZ so as not to saturate one small sector of the DZ, thus making a lucrative enemy target. Consider the time and distance factors where load No. 1 and load No. 2 from the same aircraft will land. For example, delivering a Howitzer and its prime mover from the same aircraft ensures they both land on the same DZ but physically separated. The crew should be cross loaded accordingly.

b. Adjust loads and HD impact points so Howitzers and prime movers land at or near the same point. If the gun crew cannot locate their assigned prime mover right away, they should take the nearest one they can find and move out.

c. Do not waste time looking for a particular bumper number in the DZ. If the vehicle belongs to the unit, recover it.

d. Carefully plan CDS delivery. Do not drop it out in the center of the DZ. Drop it along the edge of the DZ or on the unit assembly area, or, if needed later, deliver it on or near the assault objective. Regardless of the decision as to where and when the CDS is needed, plan carefully so that backhauling is reduced.

22-4. HEAVY DROP LOADS

The minimum-essential HD loads should precede the personnel drop. Other important HD equipment should follow the assault personnel drop as soon as possible. Units cannot fight without heavy weapons, vehicles, and ammunition bundles. Peacetime safety rules (which require 30 minutes to an hour separation between personnel drops and HD, unless the HD is delivered first) do not apply in combat.

a. Door bundles or wedge loads can be dropped from any aircraft. Bundles should be exited on the green light, with troops following immediately.

b. Assembly plans do not work if troops are delivered to the wrong DZ or delivered off the DZ. Leaders should never bypass a trooper on the DZ. Every parachutist wandering around the DZ should be policed up and either pointed in the right direction or taken with the unit.

22-5. INJURED PERSONNEL

Medics should be instructed not to stop on the DZ to care for injured parachutists (nonbattle casualties). Medics must join and move to the assault objectives with their assigned units. Injured parachutists will be cared for later. Parachutists must be briefed and understand that they cannot stop on the DZ to help their buddies who were hurt on the jump. Speed is critical; every trooper/parachutist is needed to seize and secure the assault objective. This is extremely important to troops entering combat for the first time.

22-6. SUPPLIES

Always obtain twice the number of critical items needed for mission accomplishment.

a. Resupply and ammunition replenishment are the parachutist's most serious problem. Regardless of grade, parachutists should jump in extra LAWs, antitank mines, Dragon missiles, mortar rounds, or radio batteries. They must not rely on CDS.

b. Minimum rations should be carried. A soldier can fight effectively for several days on one ration a day but cannot fight without water and ammunition. Since speed, agility, and stamina are required for mission accomplishment and reduced casualties, he should pack only a basic load of ammunition, EXTRA ammunition, and water.

APPENDIX A

JUMPMASTER TRAINING COURSE

The Jumpmaster Training Course is the standard US Army course of instruction designed to qualify individuals as jumpmasters for conventional static line parachuting. It is the standard for all airborne unit activities. The course is about two weeks long and contains 97 hours of instruction.

SUBJECT	SCOPE	HOURS
Inprocessing	Administrative inprocess of class.	1.5
Orientation and Administration	Orientation on the course requirements that the student must meet to include student handouts, questionnaires, the entire training schedule, and the grading system used to evaluate students.	1.0
Duties and Responsibilities of the Jumpmaster and Safety	Discussion of the duties and responsibilities of the jumpmaster and safety personnel from the time of notification until completion of the airborne operation.	1.0
Individual Equipment Containers	Discussion of the characteristics and nomenclature of individual equipment containers to include a demonstration on the correct rigging, attachment, and lowering procedures for the ALICE, M1950 adjustable weapons container, CWIE, and DMJP.	2.5
Army Aircraft Orientation	Familiarization with the preparation, inspection, and jump procedures for the UH-1H, UH-60A, and CH-47 helicopters.	1.5
Jumpmaster Personnel Inspection	Demonstration of the correct method of inspecting a parachutist and attached combat equipment. Remaining hours are spent on practical exercise using two-man buddy teams, where the student is required to conduct a personnel inspection and find/report major and minor rigging discrepancies that have been placed in the parachute assembly and attached equipment. Change over students often to ensure all receive the same amount of inspection time.	23.5

SUBJECT	SCOPE	HOURS
Pre-Jump Training	Discussion of the five points of performanceand methods of activating the reserve, towed parachutist procedures, collisions, entanglements, and the three types of emergency landings.	1.0
A-Series Containers	Discussion of the characteristics, capabilities, and methods of packing, rigging, and inspecting the A-series containers, and how to attach and inspect the cargo parachute.	2.0
Drop Zone Support Teams	Discussion of the prerequisites to perform duties as the drop zone support team leader (DZSTL), drop zone safety officer (DZSO), assistant drop zone safety officer (A/DZSO), and composition of the team for different airdrop scenarios. Scoring procedures using MAC Form 168 are included.	1.0
Jump Commands, Door Procedures, and Door Bundle Ejection Procedures	Demonstration and practical exercise of the proper sequence of jump commands and time warnings with proper arm-and-hand signals; the door procedures used by a jumpmaster; and door bundle ejection procedures using aircraft mock-ups. Remaining time is spent for practical exercise in the mock-ups (or actual aircraft).	8.5
Drop Zone Selection Procedures	Drop zone selection factors are discussed. Practical exercise using the formula for computing DZ length (D = RT), wind drift (D = KAV) using either the mean effective wind measured with the pilot balloon (PIBAL) or the surface wind as measured with the AN/PMQ-3A anemometer. Additional discussion includes drop zone surveys (MAC Form 339), and how forward throw is determined and used in computations.	2.0

SUBJECT	SCOPE	HOURS
Drop Zone Identification	Discussion on the methods of marking drop zones for computed air release point (CARP), ground marked release system (GRMS), and the verbally initiated release system (VIRS) drops. Familiarization with drop zone marking requirements for day and night airborne operations.	2.0
Nomenclature Examination	Written nomenclature examination.	0.5
Drop Zone Operations	Practical exercise using a round-robin 4.5 training scenario, rotating students to several different stations where they are required to complete forms, operate equipment, and compute formulas. Station activities include: drop zone scoring (MAC Form 168), drop zone surveys (MAC Form 339), use of the AN/PMQ-3A anemometer, use of pilot balloon equipment, use of D = RT formula, use of D = DAV formula, and actual DZ marking for CARP and GMRS.	
Review and Critique	Brief review of the previous week's instruction to ensure all questions and tasks are clear.	1.0
Nomenclature Examination Retest	For personnel who failed the initial test.	0.5
Written Examination	Written examination covering all instruction that has been presented.	1.0

SUBJECT	SCOPE	HOURS
Jumpmaster Personnel Inspection Examination	Each student inspects three parachutists – two hollywood (no combat equipment) and one combat-equipped parachutist (4 minutes 30 seconds time limit).	3.0
Jumpmaster Personnel Inspection Retest	For personnel who failed the initial test.	2.0
Pre-jump Training Examination	Oral presentation by each student to determine his ability to effectively conduct pre-jump training.	2.0
Jumpmaster Briefing	A briefing on all airborne operations and grading procedures.	1.0
Day Orientation Jump/ Aircraft Inspection Class	Practical exercise on aircraft inspection procedures using the C-130 or C-141. Orientation flight for familiarization with the aircraft, en route checkpoints, and drop zones, allowing each student to perform a door safety check and 360-degree outside air safety check.	5.0
Written Examination Retest	For personnel who failed the initial test.	1.0
Day Door Bundle Jump Examination	Graded practical exercise ejecting a door bundle and one combat-equipped jumper. Half the students are graded while the other half act as their jumper.	7.0
Day Door Bundle Jump Examination/ Combat Equipment Jump (Retest)	The other half of the students perform the duties as listed above. A second lift is required for retest personnel.	17.0
Maintenance of Air Items	Inspection, maintenance, and turn-in of all air items used during the airborne operations.	1.0
Outprocessing	Administrative outprocessing the class.	2.0
Graduation		1.0

APPENDIX B

SUGGESTED JUMPMASTER REFRESHER COURSE

The suggested Jumpmaster Refresher Course is designed to update qualified jumpmasters who are not current in their jump status. This course ensures that standardization is maintained. The unit designated to conduct this course ensures that equipment normally used is available for this training.

SUBJECT	SCOPE	HOURS
Individual Equipment	Characteristics and nomenclature of individual equipment containers. Demonstration on the correct rigging, attaching, and lowering procedures for the ALICE, M1950 adjustable weapons container, CWIE, and DMJP.	1.0
Jumpmaster Personnel Inspection	Demonstration of the correct method of inspection a parachutist and attaching combat equipment. Practical exercise using two-man buddy teams, where the individual is required to conduct a personnel inspection and find/report major and minor rigging discrepancies that have been placed in the parachute assembly and attached equipment. Change personnel often to ensure all receive the same amount of inspection time.	2.0
Pre-jump Training	Discussion of the five points of performance and methods of activating the reserve, towed parachutist procedures, collisions, entanglements, and the three types of emergency landings.	0.5
Drop Zone Support Teams	Discussion of the prerequisites to perform duties as the drop zone support team leader (DZSTL), drop zone safety officer (DZSO), assistant drop zone safety officer (A/DZSO), and composition of the team for different airdrop scenarios. Scoring procedures using MAC Form 168 are included.	1.0
Jump Commands, Door Procedures, and Door Bundle Ejection Procedures	Discussion and practical exercise of the proper sequence of jump commands and time warnings with appropriate arm-and-hand signals, door procedures used by a jumpmaster, and door bundle ejection procedures. A demonstration is given using aircraft mock-ups. The remaining time is spent for practical exercise in the mock-ups (or actual aircraft).	1.5

SUBJECT	SCOPE	HOURS
Drop Zone Selection Procedures	Discussion of drop zone selection factors. Practical exercise on using the formula for computing DZ length (D = RT), computing wind drift (D = KAV), and using either the mean effective wind measured with the pilot balloon (PIBAL) or the surface wind as measured with the AN/PMQ-3A anemometer. Additional discussion includes drop zone surveys (MAC Form 339), and how forward throw is determined and used in computations.	1.0
Drop Zone Identification	Discussion on methods of marking drop zones for computed air release point (CARP), ground marked release system (GMRS), and the verbally initiated release system (VIRS) drops. Students are familiarized with drop zone marking requirements for day and night airborne operations.	1.0

GLOSSARY

ADEPT	alternate door exit procedure for training
ADP	airdrop personnel
AFCCT	Air Force combat control team
AGL	above ground level
ALCE	airlift control element
ALICE	all-purpose, lightweight, individual, carrying equipment
ATC	air traffic control
AWADS	adverse weather aerial delivery system
AZAR	assault zones availability report
CARP	computed air release point
CCP	circulation control point
CCT	combat control team
CDS	container delivery system
CO2	chemical gas
COMALF	commander of the airlift forces
CWIE	container, weapon, individual equipment
DA	departure airfield
DACO	departure airfield control officer
DMJP	Dragon missile jump pack
DZ	drop zone
DZSO	drop zone safety officer
DZST	drop zone support team
DZSTL	drop zone support team leader
FLA	frontline ambulance

GLA	ground liaison officer
GMRS	ground marking release system
GTA	ground-to-air
HALO	high altitude, low opening
HD	heavy drop
HE	heavy equipment
HPT	hook-pile tape
HSPR	harness, single-point release
IAW	in accordance with
IMC	instrument meteorological conditions
intercomm	intercommunication (radio)
JMPI	jumpmaster personnel inspection
JTF	joint task force
LAW	light antitank weapon
MAC	military airlift command
METT-T	mission, enemy, terrain, troops and time available
MEW	mean effective wind
MO	malfunction officer
MOD	modified
NAVAIDS	navigational aids
NCO	noncommissioned officer
NLT	not later than
OD	olive drab
OIC	officer in charge
PI	point of impact
PIBAL	pilot balloon
PLF	parachute landing fall

RAM	raised angle marker
RP	release point
SAW	squad automatic weapon
SKE	station-keeping equipment
SOF	special operations force
SOI	signal operation instructions
SOP	standing operating procedure
SSN	social security number
STABO	(Combined first letters of the surnames of the five persons who designed the system.)
TAP	tactical airdrop personnel
TOT	time on target
USAF	United States Air Force
VIRS	verbally initiated release system
VMC	visual meteorological conditions
VS	visual signal
WSVC	wind streamer vector count

REFERENCES

REQUIRED PUBLICATIONS

Required publications are sources that uses must read in order to understand or comply with this publication.

FIELD MANUALS (FMs)

57-220	Basic Parachuting Techniques and Training

RELATED PUBLICATIONS

Related publications are sources of additional information. Users do not have to read them in order to understand this publication.

ARMY REGULATIONS (ARs)

59-4	Joint Airdrop Inspection Records, Malfunction Investigations and Activity Reporting
350-1	Exchange of Small Army Units Between the United States and Allied Nations for Training

DEPARTMENT OF DEFENSE (DD Forms)

1387-2	Flight Certificate (LRA)
1574	Serviceable Tag - Materiel
1748-2	Airdrop Malfunction Report (Personnel Cargo)

FIELD MANUALS (FMs)

10-501/TO 13C7-1-11	Airdrop of Supplies and Equipment: Rigging Containers
10-550/TO 13C7-22-71	Airdrop of Supplies and Equipment: Rigging Stinger Weapon System and Missiles
31-25	Special Forces Waterborne Operations
31-71	Northern Operations
100-27/AFM 2-50	USA/USAF Doctrine for Joint Airborne and Tactical Airlift Operations

MILITARY AIR COMMAND FORM (MAC Forms)

168	Airdrop/Airland/Extraction Control Log
339	Drop Zone Survey

MILITARY AIR COMMAND REGULATION (MAC Reg)

3-3	Combat Control Team Operations and Procedures (see chg 1 25 June 91

TECHNICAL MANUALS (TMs)

10-500-6	Airdrop of Supplies and Equipment for Army Aircraft
10-1670-201-23/TO 13C-1-41	Organizational and Direct Support Maintenance Manual for General Maintenance of Parachutes and Other Airdrop Equipment
10-1670-240-20/TO 13C7-49-11	Organizational Maintenance Manual (Including Spare Parts and Special Tools List): Miscellaneous Airdrop Canvas, Webbing, Metal, and Wood Items
10-1670-251-12	Operator and Organizational Maintenance Manual (Including Repair Parts and Special Tools List): Lowering Device, Cargo and Personnel, 500-Pound Capacity
10-1670-262-12	Operator's and Organizational Maintenance Manual (Including Spare Parts and Special Tools List) for Personnel STABO Extraction System and Cargo and Personnel LoweringAncho Device
38-250	Packaging and Materials Handling: Preparation of Hazardous Materials for Military Air Shipment
55-1520-237-10	Operator's Manual: UH-60A Helicopter

TRAINING CIRCULARS (TCs)

31-19	Special Forces Military Free-Fall Parachuting
31-24	Special Forces Air Operations

US AIR FORCE REGULATION (AFR)

71-4	Packing and Handling of Dangerous Materials for Transportation by Mil Aircraft

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